THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. LX. SATURDAY, JUNE 4, 1892. No. 23.

ORIGINAL ARTICLES.

INFECTIOUS DISEASE IN CITIES; WITH ESPECIAL REFERENCE TO DENVER.

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STEP by step science is increasing our knowledge of etiology by adding to the list of microbic diseases. To-day we admit the parasitic origin of maladies that, ten years ago, we thought typically non-parasitic. To-morrow we may include in the microbic list ailments that now give no hint of their infectious nature. A recent writer[1] concludes from his personal researches that, to the list of proven infectious diseases, we must now add articular rheumatism, pharyngitis, tonsillitis, intercostal neuralgia, and some forms of sciatica.

Though science has proven the infectious nature of many diseases, medical art has, in most cases, failed in settling on definite modes of treatment, still less in intelligently annulling the conditions under which these diseases flourish.

In the present state of knowledge, we are justified in stating that all infectious diseases are each caused by a distinct chemic or anatomic entity that enters the body from without. If this morbific agent be kept out of the body, no sickness results; if it be allowed to penetrate the body, the effect, whether simply negative or positive in sickness or death, depends altogether on the relative vital resistance of the invader and the invaded. We can properly go a step further, and declare that the causes of infectious diseases are living microörganisms that, as can be proved by laboratory experiment, need for their development and activity certain conditions of heat, moisture, illumination, and food-supply.

We may generalize still further: It is well known that the processes of putrefaction and fermentation are simply the effects of the development of certain microörganisms, and are the signs of living agents operating on dead matter—as Huxley puts it, "Putrefaction is a concomitant, not of death, but of life." The microörganisms of disease need for their development a food-supply of decomposable or, roughly speaking, putrescible matter. Every community is continually producing quantities of such matter in the animal and vegetable wastes incident to living; in the kitchen garbage and slops, in fecal matter and in urine, in sweat and in the vapors of respiration. It follows that the more completely the soil and the drinking-water of a neighborhood are saturated with these putrescible waste-matters, the more likely it is that disease-germs once dropped upon them will abide and flourish—not that so-called "filth" *creates* infectious diseases, but that it preserves and nurtures them when once they are implanted. This appears a simple and self-evident proposition, yet it is for the practical sanitarian a bulwark of defence that alone stands between him and the assaults of those whose self-interests his duties compel him to disturb.

Filth harbors disease. We must fix on this general fact as the outcome of all human experience. For the more we consider the conclusions of different scientific investigators concerning the special conditions that determine various diseases, the more confused and uncertain must our ideas become in proportion as we give weight to authorities. It is not long since Koch and his corps of assistants, working in Egypt and in India, proved to their own satisfaction that the cholera, endemic there, was produced by organic contamination of drinking-water, and, moreover, that the specific agent of infection was a demonstrable microörganism, the so-called "comma bacillus." On the other hand, Dr. J. M. Cunningham, who for thirty-eight years practised medicine in India, and for twenty years was chief of the Indian Sanitary Bureau, with unequalled advantages for comparative observation, says, in his work on the subject, that no outbreak of cholera in any part of India has been shown to have etiologic relation to the drinking-water, and when such a relation seemed to exist, closer investigation showed the error of the belief.[1]

Again, the opinion is world-wide that there is a causal relation between the condition of the drinking-water and the development of typhoid fever in a community. The evidences and authorities in favor of this belief are almost numberless. Yet for years one of the foremost sanitarians of the age, Von Pettenkofer, of Munich, has declared against the connection between the water ingested and the occurrence of typhoid fever.

Not long ago, Dr. Kratter[2] published the results

[1] E. Reger: Zur Lehre von den Contagiösen Infectionskrankheiten. Berlin, 1890

[1] Quoted from Kratter, "Studien über Trinkwasser u. Typhus." Gratz, 1886.

[2] Kratter: Loc. cit.

of a series of investigations that he had carried on for five years in the town of Gratz, on the connection between the purity of the drinking-water and the development of typhoid fever. Kratter found no such relation; on the contrary, he discovered that the greatest number of cases of typhoid fever developed in neighborhoods supplied with the purest, and the smallest number in districts furnished with the impurest drinking-water. On the other hand, Kratter found that the people living in a part of the city in which the underlying bed-rock rose in a ridge toward the surface, giving a free subsoil drainage, though their habits were ultra-filthy, and though they used the chemically bad drinking-water, were singularly free from typhoid fever. An American hygienist, Professor V. C. Vaughan, of the University of Michigan, after an exhaustive study, chemic and bacteriologic, of a number of specimens of drinking-water that were supposed to have caused typhoid fever, was unable to show in them the presence of any specific element of contagion.

On the other hand, v. Födor, one of the ablest living bacteriologists, working in the city of Budapest, found a close relation between the condition of the drinking-water and the development of cholera, typhoid fever, diarrhea, and smallpox; while no such relation was apparent in the development of intermittent fever, scarlet fever, diphtheria, or mumps.

The apparent discrepancies in the conclusions of advanced scientific workers will all be harmonized in time. In the meanwhile, we may rest secure in the belief that a healthy community in a healthy neighborhood presupposes pure food, pure water, pure air, pure soil; and the best provisional definition of purity is the absence of the waste-matters produced by organized life, and of deleterious chemicals of whatever sort.

Though a closer study of micro-biology shows that every specific pathogenic microörganism grows best under certain definite conditions of heat, food, and moisture, it is a broad fact of inestimable practical value, and one that has been established by the experimental researches of sanitarians in the last two decades, that the sanitary measures that are successful in limiting the spread or preventing the development of any single infectious disease, as, *e. g.*, cholera, are, at the same time, efficacious against all other infectious diseases.[1]

Using this conclusion as a starting-point, we are prepared to enter upon a study of the conditions that determine the existence and spread of infectious disease in Denver—not by theoretic generalizations, but by exact observation of the varied conditions under which flourish individual diseases. In order to carry out such a research, we must have accurate information as to the total number of cases affected with a definite disease, and their distribution in the city. There are only two infectious diseases that are sufficiently common to make them of great importance, and concerning which our imperfect laws are sufficiently stringent to allow us to rely upon a full report of cases—namely, scarlet fever and diphtheria. In some other countries, as in England, probably on account of peculiar meteorologic conditions, whooping-cough stands among the most fatal infectious diseases, but with us it seems to be comparatively unimportant.

The vital statistics of Denver regarding scarlet fever and diphtheria, show that in 1890, with a census population of 106,713, there were reported 276 cases of scarlet fever, with a mortality of 4.7 per cent.; and 695 cases of diphtheria, with a mortality of 31.6 per cent.

In 1891, with an estimated population of 113,874, there were reported 256 cases of scarlet fever, with a mortality of 6.9 per cent., and 440 cases of diphtheria, with a mortality of 32.9 per cent. One is startled at the high mortality due to diphtheria. But the statistics of cases admitted to the hospitals of Paris between 1866 and 1890 show a much higher death-rate;[1] and in a recent epidemic in the town of Heywood, in England, more than 50 per cent. of the cases reported died.

I think it may be taken for granted that absolute accuracy in any table of vital statistics is impossible. Clerical errors are prone to arise in computations involving thousands of complex numerical data; the conclusions presuppose a full report of all cases, and, what will be probably forever hopeless of attainment, a uniform diagnosis of the true nature of maladies.

Thus, in the Paris hospitals, between 1866 and 1890, the absolute mortality from diphtheria increased about fivefold, though the proportion of cases ill with the disease increased nearly tenfold. A somewhat similar increase of diphtheria, within the period mentioned, is recorded throughout France. In England, since the national introduction of definite sanitary measures, especially since 1875, there has been a remarkable diminution in the rate of mortality from infectious diseases, with the exception of diphtheria.

The figures show that, in this disease, there has been both an absolute and relative increase of mortality. A writer in the *Lancet* has recently offered an explanation for this strange result by calling attention to the fact that, with the apparent increase of diphtheria, there was more than a cor-

[1] Revue d'Hygiene, 1891, p. 45.

[1] Idem, 1891, p. 687.

responding decrease in the reported cases of scarlet fever and various throat-affections—leading to the suspicion that, with the more perfect development of the art of diagnosis, or, perhaps, as the result of a change in medical fashion, many diseases now regarded as diphtheria were formerly ascribed to other causes.

The first essential to any intelligent measures for the repression of infectious diseases is an inquiry into the manner of their propagation and dissemination.

We are justified in making the dogmatic assertion that infectious diseases may be distributed in two different ways. First, the disease may be transferred directly from the sick person to the body of one who is well, *i. e.*, through personal infection. Second, the contagium, or disease-germs, cast out by the patient may remain indefinitely in the room or on the clothes, or other articles surrounding him, and, after a longer or shorter time, find entrance into the bodies of persons coming in contact with them. Again, it can hardly be denied that disease-germs cast off from the body of a sick person come at once under conditions that are either favorable or unfavorable to their preservation. Fortunately for the maintenance of our species, the usual conditions in which these germs find themselves on being cast off from their host, are unfavorable to their life. Thus, it is sufficiently proven that sunlight is a powerful germicide; also, oxygen with, in some cases, the assistance of moisture, and, in others, of dryness, destroys the pathogenic organism. Occasionally, however, the disease-germs emanating from the body of the sick fall into an environment favorable to their life, or on a soil suitable to their reproduction. Here, then, the respective disease becomes endemic; and it is of the first importance for us to know the external conditions that favor the multiplication of each micro-organism.

To summarize the statements just made: The disease-germ has two loci of propagation—first, outside of the body, in soil suited to its growth, in which case its effects are invisible to us; second, inside of the body of lowered physiologic resistance, and then disease is the result.

It may be mentioned in passing that all authorities seem to agree that the bacillus of typhoid fever lives best in moist ground, somewhat under the surface, and is quickly killed by desiccation and sunlight; also, what is especially important in this discussion, that the germs of diphtheria live on the surface of the ground, and that moisture seems necessary to their reproduction.

Fecal matter is said to constitute particularly good soil for the preservation and propagation of most disease microörganisms. On the other hand, ordinary soil has extraordinary powers of self-purification, and soon destroys the vast majority of micro-organisms that fall upon it. This is the property made use of in the purification of water by interrupted filtration. It is generally admitted among bacteriologists that the number of microörganisms in the soil diminishes as we dig below the surface, and that at a depth of from eight to ten feet they totally disappear.

Next in importance to the determination of the conditions under which pathogenic organisms are preserved and reproduced, is the question as to the manner and circumstances amid which the infectious principle enters the bodies of its victims. I do not hesitate to assume, again, that the infectious principle is a living microörganism.

We are well within the bounds of proven fact when we assert that each microörganism has a cycle of existence, during the various stages of which it shows differences of resistance to the action of destructive agencies. It is, perhaps, a permissible assumption, that, at certain stages of its development, the pathogenic germ has unusual propagating energy, and it is while in this physiologic condition that it would prove most likely to cause infection.

Apropos of this question, it would be exceedingly interesting to review some conclusions recently expressed in a remarkable work on the dissemination of infectious diseases, by Dr. E. Reger, physician to the Military Training-school at Potsdam, Prussia.[1]

For a number of years Reger has been in a position to make exact clinical observations on the cadets in training at the military school mentioned. The conditions of discipline appear to have been such that the hourly distribution and associations of the cadets were known, so that the path taken by any infectious disease in its progress could be accurately determined. Under these circumstances Reger studied the dissemination of a number of infectious diseases, including diphtheria, scarlet fever, measles, and mumps.

Naturally, as soon as the first symptoms of infectious disease appeared in any cadet, the patient was at once removed to and maintained in the hospital. It was usually found, however, that when a certain cadet became ill with a disease that proved to be infectious, other cases afterward appeared, and always among those who had been in closest personal relation with the original victim.

This is the briefest possible statement of the grounds on which Reger makes the important announcement that "infectious diseases are spread by personal contact with sick persons, and not, usually, by contact with infected articles or places." Moreover, according to Reger, it is either in the period

[1] Op. cit.

of commencement or at the acme of the disease that the patient is most dangerous as a source of infection. In the scaling stage, or declining period of the disease, the danger of infection is comparatively small.

Reger's idea is that the infecting microörganism has most virulent nutritive and propagating powers at only a definite stage in its cycle of existence, and this is when it is actively multiplying at the commencement or height of an infectious attack. The microörganisms contained in the scales of desquamation have already nearly lost their vitality, and but feebly attack any physiologic surface on which they may fall.

This work appears to be an important contribution to the science of epidemiology, and the general conclusions reached are not necessarily invalidated by the exceptions to their truth that will at once suggest themselves to every mind. One other conclusion of Reger's is appropriate to our subject, namely, that in nearly all cases infection is of a mixed type—in other words, in most maladies various pathogenic organisms of different specific natures are active within the body, and only as one or another of them gets decidedly the upper hand in its development can we definitely characterize the disease as diphtheria, scarlet fever, etc. Both at the beginning and at the ending of an epidemic, especially, other microörganisms come more to the foreground, and we have tonsillitis, sore-throat, etc. Only one disease, according to Reger, constantly breeds true and reproduces its like in individual after individual, and that is measles. The course of other infectious diseases, as diphtheria and scarlet fever, in a succession of persons who have serially inoculated each other, is interrupted by diseases that are, in general, similar to them, but by no means have their specific character.

In the foregoing lines I have endeavored to state, though in the merest outline, some general considerations that must be borne in mind in any intelligent attempt to cope with infectious disease.

The first fact to determine, in studying the influences that engender contagious diseases in Denver, is the local distribution of the maladies.

This has been most satisfactorily accomplished by marking on a map of the city the exact location of each case of infectious disease as it is reported. In this way are marked on the same map, in different colors, all reported cases of diphtheria, scarlet fever, and typhoid fever. Separate maps are used to show the distribution of disease for each month, and also for the quarter, half, and full year. A glance at such a map indicates at once a tendency of the diseases to fall into groups or follow certain neighborhoods. The cause of this grouping is one of the most difficult problems with which we have to deal, and its discussion will be, for the present, delayed. It is the present policy of the Health Department to submit all premises on which the presence of infectious disease is announced to thorough sanitary inspection within a month after the case has been reported.

The inspector for this work is a medical man, chosen with especial reference to his tact and address. He is furnished with a note-book having printed on one side of each sheet the following list of questions to which written answers are returned:

No. —. Date —. Name —. Residence —. Number in family —. Habits —. Previous sickness in family —. Disease —. Time of —. Number affected —. History —. House: age —; frame or brick —. Number of floors —. Number of rooms —; living, sleeping —; bath, closet, kitchen sink, connected with —. House heated by —. Rooms ventilated —; dry, damp —. Plumbing —. Cellar: size —; walls —. Floor: damp, dry —; ventilated —. Ventilation under house —. Previous sickness in house —. Premises: number of lots —; proportion covered —. Sewer connection —. Cesspool: leaking, tight —; privy vault: leaking, tight —; hopper, plunger —. Water-supply —. Milk-supply —. Ice-supply —. Disposal of slops —; of garbage —. Adjacent premises: condition —, alley —, ditch —, slope of surface.

On the reverse side of the sheet is a space for a diagram of the premises, and for remarks appropriate to the special case; these are frequently of more value than the answers to the printed questions. Every inspection is numbered and properly listed in a card catalogue so that it may be referred to at a moment's notice. It may be remarked, in passing, that a somewhat similar inspection record-book is in use by the plumbing inspectors, and another appropriate to a full sanitary investigation of the dairies supplying milk to the city.

There have, thus far, since August, 1891, been recorded 500 general sanitary inspections of different premises harboring contagious disease. In 237 cases the inspection was made on account of the occurrence of scarlet fever, and in 263 cases because of diphtheria—that is, 47.4 per cent. were cases of scarlet fever, and 52.6 per cent. of diphtheria.

Any conclusions based on the data thus obtained must be drawn with exceeding care, lest they have to be reversed with the wider knowledge of increased experience.

The first essential to the healthfulness of a household would seem to be cleanliness in the habits of the people. It is believed that a tolerably correct idea of the general mode of life of a family, as affecting its health, can be gained even in the limited time devoted to an official inspection. Con-

cerning the habits of households afflicted with infectious disease our statistics show that, in the case of scarlet fever, 37 per cent. of the families are represented as of good or clean, and 62 per cent. as of bad or filthy habits; while in the diphtheria households only 29 per cent. are good and 70 per cent. bad; that is, on the whole, the better class of people incurs scarlet fever, and the lower class suffers from diphtheria.

The material of which a house is built would seem to have some relation to its sanitary condition. Of the houses harboring scarlet fever we find 79 per cent. brick, 15 per cent. frame, and less than ½ per cent. tents; while in those with diphtheria, 72 per cent. were brick, 25 per cent. frame, and 3 per cent. tents. Tent life affords no protection against disease when, as is usually the case, people living in this way have habits that are ultra-filthy. We are, however, at once struck by the high percentage of frame houses, particularly in cases in which diphtheria has occurred. In the thirty-first sewer district, containing probably as large a proportion of frame houses as any similar area in the city, it has been found by actual count that the frame houses constitute less than 25 per cent. of the total number of dwellings; but more than 25 per cent. of the cases of diphtheria reported occurred in frame buildings. It may be added that diphtheria seems particularly common and especially virulent in cases in which old boards, soaked with moisture, are found either in or about the infected house.

The ventilation of the apartments of a house has a very broad sanitary bearing as determining the physiologic resistance of the occupants against any disease. We find recorded that in the scarlet fever houses the rooms were well ventilated in 41 per cent. and badly ventilated in 58 per cent. of cases; while in the diphtheria houses the ventilation was good in only 32 per cent. and bad in 67 per cent.

From time immemorial, dampness in living and sleeping apartments has been regarded as evidence of insalubrity. In this dry climate, it is a point of especial significance. According to the view of modern science, dampness is necessary to the reproduction of pathogenic organisms, which are, moreover, held in its grasp and prevented from escaping. Of the scarlet fever houses, 73 per cent. are recorded as dry, and 26 per cent. as damp. Of the diphtheria houses only 67 per cent. are dry and 32 per cent. damp.

We now come to a sanitary question that seldom seems to trouble the artistic mind of the architect, and still less disturbs the practical nature of the contractor and builder. Every house set upon the ground acts as a chimney for the gases and vapors in the soil. The heated air of the house in rising sucks from the soil the gases contained in it, and these permeate the rooms of the dwelling to take part in supplying the respiratory needs of its occupants. The means for this communication between the house space and the ground space are abundant. In the lower rooms there can frequently be demonstrated a strong breeze blowing into the rooms from the space beneath the floor through the cracks between the ends of the floor-boards and the side-wall.

This matter will, perhaps, seem of greater importance when reference is made to those influences that cause pollution of the soil beneath a house. In the meanwhile, it is an interesting observation, made by an English hygienist, that, under the best conditions, every house in a large city is enveloped in an atmosphere charged with impurities that are deposited on the neighboring surfaces that can retain or absorb them. In other words, an inhabited house, like a living body, is continually exhaling noxious matters. Evidently the way to avoid breathing this foul and disease-breeding ground-air is to coat the ground and walls under the house with cement, or better, asphalt, impervious to air and moisture, and then to thoroughly ventilate all the space under the ground floor. In the houses noted in our records, there was seldom a cellar under the whole of the house, and the cellar, when present, rarely afforded efficient ventilation for the remaining ground-space.

The *data* are as follows:

In the scarlet fever houses there was no cellar in 18 per cent.; the cellar floor was of dirt in 69 per cent., of cement in 16 per cent., of board or brick in 14 per cent. The cellar was dry in 20 per cent., and damp in 79 per cent. There was no ventilation under the house in 43 per cent.; it was poor in 39 per cent., and good in 17 per cent. In the diphtheria houses the condition was worse, namely: No cellar in 23 per cent.; dirt floor in 68 per cent., cement in 17 per cent., board or brick in 14 per cent.; the cellar was dry in 20 per cent., and damp in 79 per cent.; there was no ventilation under the house in 67 per cent., it was poor in 16 per cent., and good in 16 per cent. In most cases the nature of the surroundings aroused strong suspicions that the dampness was the result of soakage from leaking cesspools or from slops thrown upon the surface; it is common to find a fungous growth upon the cellar walls.

It is manifestly a matter of the very first sanitary importance that the sewage and garbage should be completely removed from the neighborhood of all dwellings. In large communities there seems to be but one efficient mode of disposal of fecal matter and slops, and that is by means of a well-con-

structed system of sewers. The fate of the garbage is largely determined by the habits of the members of the community. It seems impossible to educate the mass of the people to consuming it by fire. Until a short time ago, Denver was very inadequately sewered; but there is excellent prospect that, within a year, only a small portion of the city will lack this means of filth-removal. Even in the sewered parts of the city the proportion of houses connected with the sewer amounted in June, 1891, to considerably less than 25 per cent. For the most part, the house-wastes, when not thrown upon the ground, were conducted to cesspools and privy-vaults, which almost invariably leaked, saturating the ground with the best of germ-propagating food.

As regards sewer-connection, our figures show that, of the scarlet fever houses, 36 per cent. were so connected and 63 per cent. not connected; 33 per cent. had neither cesspools nor sewer-connection; while 30 per cent. had cesspools, of which 91 per cent. leaked. In the diphtheria houses, only 22 per cent. were sewer-connected; 49 per cent. had neither cesspools nor sewer-connection; 28 per cent. had cesspools, of which 94 per cent. leaked. These figures, at least, indicate that there are no virtues in an unsewered district, as such, that protect that district from disease.

It was the first inclination to believe that these data definitely proved the superior sanitary advantages of sewer-connection, but, on comparing with the total number of houses in the thirty-first sewer district the number of those that had been connected with the sewer up to June 1, 1891, it was found that only a little more than 24 per cent. of the houses were so connected; on the other hand, of the houses in the thirty-first district examined on account of the presence of infectious disease, it was found that more than 41 per cent. were connected with the sewer. This result impresses upon us an important corollary to the general sanitary law of waste-removal, and that is, that though efficient sewerage is, for a large community, the best means yet discovered for the disposal of slops and fecal matter, there may be such radical defects in the work of the drain-layer and plumber that the sewer becomes an actual menace to health.

There are two principal ways in which sewer-connection may become a positive danger. The plumbing in a house, unless constructed in a most conscientious manner by workmen possessing a considerable amount of trained knowledge, is almost sure to result in a set of apparatus easily made foul and difficult to clean, and in traps that readily lose their seal and admit into the rooms the gases from the sewer. We hear a great deal about "sewer gas," and it is a most convenient cudgel to arouse the apprehension of householders whose premises need sanitary remodelling; for people are to be convinced by things visible, palpable, and odoriferous, if not by the logic of scientific facts. Yet sewer-gas is, chemically, not a very poisonous agency, and it may be doubted that it often produces serious evils, except when it rises in bubbles from fermenting or agitated sewage and carries with it a spray of moisture containing pathogenic microorganisms. No one can predict when such a catastrophe may arise, and, harmless or not, none but an imbecile would willingly permit the admixture of sewer-gas with the air to be breathed by his household. Probably a more serious defect than insufficient plumbing within the house arises from the leaky condition of the soil-pipes on or under the surface of the ground beneath the house. Nearly all the soil-pipes in Denver that were laid previously to two or three years ago, were constructed of short pieces of tile, cemented together. Sooner or later, such tile-drains begin to leak at their joints, gradually saturating the soil beneath the house with fecal matter that, as already pointed out, is one of the best of all media for the preservation, if not the propagation, of pathogenic organisms, and is the substance that, above all others, is likely to contain them.

Moreover, the soil-pipe often runs very near, or even within, the fresh-air duct of the furnace, through which, in winter, air is supplied to the house for the purposes of warmth and ventilation.

It may be noted, in passing, that a serious menace to the health of many families resides in the structure and position of the channel conveying air to the furnace. This duct often opens on the surface of the ground in such a manner as to become a receptacle for filth, and it is almost invariably so leaky as to permit the free entrance of ground-air from beneath the floor.

As regards the plumbing and drains in and under the houses of Denver, suffice it to say, that not only do they too often exhibit the most glaring sanitary defects, but it is only at the price of eternal vigilance on the part of householders and sanitary officers that we can hope to avoid the repetition and perpetuation of this defective work and workmanship.

This statistical review will be brought to a close by a consideration of the source of the water-supply in the infected premises. Only one fact with regard to the water-supply seems especially significant. Seventeen per cent. of the houses infected with scarlet fever, and not less than 30 per cent. of those infected with diphtheria, depend on wells for their washing and drinking water.

These wells are never driven below bed-rock, and must receive all manner of surface-drainage. When

the sewers were laid in West Denver, it was found that the water in the wells of that section fell to the level of the sewer line. This, taken in connection with the fact that chemic analysis almost invariably shows the presence in well-water of a much higher percentage of chlorides and nitrites, the common result of fecal contamination, than does the city water, sustains the conclusion that well-water is, for the most part, dangerously polluted with the filth of surface-soil.

The foregoing sketch is but an incomplete and preliminary representation of the more salient facts in the sanitary problem of Denver. It nevertheless seems that certain conclusions of importance can safely be drawn from the data recorded. It appears, in the first place, that there is an important distinction between the habits, so to speak, of diphtheria and scarlet fever, in that the former is more fixed and the latter more nomadic in its distribution.

The more fatal disease, diphtheria, clings to certain houses and neighborhoods in which definite investigation has shown the surroundings to include the sum of those conditions that common experience has denominated unsanitary. The worse the sanitary state of the locality (not necessarily the worst to superficial observation) the more numerous are the cases, not only of diphtheria, but of typhoid fever and other infectious diseases.

Notwithstanding the conclusions of a recent writer in THE MEDICAL NEWS,[1] we are justified in still holding to the belief that diphtheria is essentially a filth-disease; its germ abides in, and is nourished by, polluted soil; and with it we have usually found associated the evidences of other infectious diseases.

The milder disease, scarlet fever, appears to be more dependent on actual contact between person and person for its transmission. Though most cases of scarlet fever, like those of diphtheria, occur in localities in bad sanitary condition, a large proportion is distributed in neighborhoods and in houses of which the sanitary condition is, at least, better than the average.

In some years there seems to be a close relation between the number of cases of scarlet fever reported and the duration of the school-term. With regard to diphtheria, however, such an association is by no means so apparent.

In the second place, if we but admit the truth of the sanitary dictum that "filth breeds disease," it can hardly be disputed that the facts recorded in the foregoing statements show abundant explanation of the existence and propagation of infectious disease in Denver.

[1] "Are Diphtheria and Typhoid Fever Filth-Diseases?" Chapin, THE MEDICAL NEWS, 1892, p. 312.

A NATIONAL SYSTEM OF SANATORIA—A PLEA AND A PROPHECY.

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IT ought to be a remarkable assertion that up to this time there is in this country not a single health-institution, invalid-retreat, or sanatorium, founded, constructed, and conducted in full and perfect accord with recent advances in medical and sanitary science; yet it is extremely doubtful whether any intelligent apologist will either contradict or seriously attempt to refute the assertion. Hence, it is impossible to avoid the conviction that, in the light of the fairly revolutionary biologic and etiologic discoveries and demonstrations of the past ten or fifteen years, we shall soon be compelled to radically revise or perhaps totally discard the present system, if system it may be called, of locating, building, and managing sanatoria.

With few exceptions, existing institutions of this kind were built and are conducted on theories and practices, or possibly only on traditions that, with comparatively few and very conservative modifications, have prevailed for generations past. Many of them were built and equipped, and are operated solely from the sordid motive of money-making. Some of them are merely the pronounced and arbitrary exponents of the medical fads and hobbies of physicians who rely on some one special or exclusive treatment, or who expatiate enthusiastically concerning the panacea of climatic influences, or the miraculous virtues of some gushing spring of earth-heated or mineral-tainted water. Others are simply invalid-hostelries, palatially and ostentatiously equipped and appointed structures, in which the fashionably sick, lame and lazy are periodically massed and charged unconscionable rates for the privilege of inhaling each other's breath, exchanging social scandals, or condoling with each other over real or hypochondriacal ailments. Millions are annually spent—for the most part squandered—by the invalid and semi-invalid classes at these resorts, either fashionable or advertisement-famous, the benefits realized being principally from the travel, the change of diet and surroundings, and the consequent mental diversion incurred.

Primarily, even as to location, it is evident that many, perhaps a majority of existing health-institutions were founded at sites selected more on account of the immediate proximity of some traditionally famous "mineral" springs, or with a view to fashionable accessibility and likelihood of popular patronage, than on account of sanatory, climatic, or hygienic considerations. In the matter of their construction and arrangement, the evident aim has been to secure the largest accommodating capacity possible for the amount of capital involved.

True, there is a margin of excuse in the fact that many, in fact nearly all, were built before sanitary science had reached its present status; but there are too many instances in which there has been a palpable disregard of known sanitary laws. In the general plans and arrangement, business expediency has been carefully considered, and commercial necessities have been made to cover a multitude of unsanitary sins. In consequence they are really *hôtels des invalides*, but in no accurate or modern sense are they sanatoria. Their managers are selected, not according to their competency as physicians and sanitarians, but for their natural aptness and tact as landlords. Considering existing standards and the incongruous conditions and demands to which they are obliged to cater, it is surprising to see how relatively well some of them acquit themselves. When they are proprietors they are expected, above all other considerations, to make money for themselves; and, when merely salaried employés, for a mercenary capitalist or some heartless as well as thoughtless stockholders. They must, therefore, trim their sails and shape their courses to meet the whims and vagaries of a fickle and unintelligent popular fashion. It is quite time that this fashion, which is almost never based on real faith or confidence, rarely even on tradition, but usually on some contagious whim, should be intelligently coached and directed, instead of being systematically and annually flattered and fostered.

The divergence of these institutions from hygienic and scientific ideals is more glaringly apparent in the matter of construction than in any other particular. With so few exceptions that they are scarcely worth mention, they are all either hostelries or hospitals. As such they are fairly suited to the temporary entertainment of either guests or patients, but they are not at all adapted for the proper or prolonged treatment of chronic invalids. Hotels and hospitals are both very necessary; but as a hotel is never a legitimate or permanent home, so a hospital can never be made a proper or efficient sanatorium.

If it were necessary to adduce evidence to confirm this assumption, it would suffice to cite the indisputable fact that all recent scientific and hygienic demonstrations unmistakably point in the direction of *segregation* as opposed to *congregation*, in the matter of housing and treating chronic invalids. In the present state of society, hotels and hospitals are indispensable; but it matters not how palatial or well-appointed they may be, both are merely sanitary compromises, since in them the plan of isolating or dissociating patients is not and cannot be made possible.

In the matter of treating chronic invalids, it is now admitted by a growing consensus of authoritative opinion that there are no specifics, that old-time dosing has at best but a very limited province, and that a skilful and scientific adjustment of all salutary natural agencies does most, and often all that is done, or that can be done, toward the relief and betterment of the patient. It must be understood that the term "natural agencies" is very comprehensive, including at once all those forces, influences, and resources of nature now so freely and generally invoked by the modern physician and sanitarian; climate, altitude, nutrition, asepsis, general hygiene, hydrotherapy, electricity, pure air, sunshine, exercise, massage, the moral and social environment, etc.—an almost interminable list.

How many of the existing "health" institutions are either situated or constructed so that the essential details of any such comprehensive or in fact of any rational system of treatment can be even approximately carried into effect? Taking into consideration the system or rather un-system under which they were organized, and the absence, at the time they were built, of some of our present sanitary light, it must be admitted that some existing institutions are doing decidedly creditable work; but it is evident that, hampered by that system and primary drawback, they can never hope to approximate an ideal standard of attainment. And while it is freely admitted that there are painstaking and conscientious workers in this field, none better than they realize their utter but inevitable limitations.

Another very serious drawback to the existing state of things is that individualized institutions, like any other independent organizations, are naturally, and must always remain, competitors. As a consequence they are in a commercial, and altogether too often in a professional, sense antagonistic. Each is duly bound to herald its own claims and asserted advantages as wholly peculiar to itself, and decidedly superior to any found elsewhere. In this imperfect world this spirit inevitably leads to detraction and misrepresentation, fosters professional jealousies, and results in frequent instances in patients being induced to seek climates and locations manifestly unsuited to their individual conditions or circumstances.

Still another considerable objection to the existing system is its relative costliness. "Well-appointed" hostelries necessarily entail heavy expense in the matter of show structures and extravagantly luxurious furnishings and equipments. It follows that so long as so-called sanatoria are virtually patterned after merely high-toned hotels, well adapted to the entertainment of miscellaneous guests, including semi-invalids, social adventurers and malcontents, periodic travellers, and that annually increasing class of the discontented victims of mere *ennui*, whose time and, possibly, money both hang heavily on their hands; in short, until the

newer demands in the matter of construction and arrangement of these institutions shall have been carefully considered and practically met, this item of comparatively needless expense is implied and cannot be avoided.

That existing "health-resorts" are liberally patronized, and that many of them are annually compelled to enlarge their facilities, by no means proves that they are in any sense model institutions, not even that they are passably unobjectionable, hygienically speaking, as popular resorts. Their success is more a matter of advertising tact and fashionable preference than from any valid claims for sanatory merit. This is sufficiently evident from the quite too frequent reports of infectious and easily preventable epidemics that somewhat more than rarely occur at these places. At the same time, the immense patronage annually and eagerly accorded to them, abundantly proves the existence of a persistent and steadily growing demand for properly planned, equipped and conducted sanatoria.

How can the requirements of modern science be met? The first and most important step is unquestionably in the direction of the segregation or semi-isolation of sick people. No set arguments are needed to substantiate this position; every microscopic revelation in the biologic field for the last ten years has reasserted it. The laws of antisepsis, all the discoveries pertaining to the processes of infection, contagion and disinfection corroborate it; the necessity for it has become pronounced and unmistakable. To accomplish it, in any thoroughly practical and effective sense, implies the cottage and dormitory plan of building, both of hospitals and sanatoria. Happily, the sanitary arguments are not the only ones to be adduced in favor of this plan. By this plan the necessity for massive, palatial, excessively ornate—and, therefore, unnecessarily costly—structures is at once obviated. It calls for a central rendezvous and supply-house, which may be very simple in design and yet architecturally tasteful, surrounded at sanitarially safe distances by groups of detached and preferably *portable* cottages, varying in design and finish from the simplest rusticity to the most ornate, to suit the tastes and purses of every grade of patrons; but which, above all else, must be perfectly adapted to the uses and purposes for which they are designed.

It is assumed that the requirements of economy as to original outlay are decidedly in favor of the cottage plan of building; but even if the reverse were shown to be the case, if rational deductions from well-demonstrated and now generally admitted data are to receive practical recognition at the hands of sanitarians and the general profession, it is quite evident that in the light of recently demonstrated sanitary science, the massing of invalids in large single edifices can no longer be tolerated. Furthermore, measured by the question of practical results, the problem of ultimate economy can have but one solution, and that in favor of the cottage plan, no matter what might be indicated by the figures of the original outlay.

Two vitally important questions remain to be considered: First, how to effectually eliminate the disastrous element of undignified and unscrupulous competition. Second, how to formulate a practical business basis on which to organize any implied or proposed "new departure."

As a possible and apparently feasible solution of the first I suggest the organization of *A National System* (or Chain) *of Sanatoria*, the same to be planned and conducted under one coördinate and coöperative management, if the term "coöperative" may be used in its higher sense and without prejudice on account of its much abuse, and if medical politics and professional jealousies can be kept in abeyance sufficiently for the purpose. Can it be that in the latter years of the nineteenth century these are impossible conditions? On the contrary, is it not true that, in all matters pertaining to sanitation and medical practice, whatever is scientifically shown to be necessary can be made practically feasible. From a commercial point of view there need be no hesitation, and certainly the profession must at all times hold itself in readiness to assume any attitude or to make any advance that science may demonstrate to be at once both logical and necessary, as well as ultimately inevitable.

It is not the design of this paper to suggest details, but the plan itself, in outline, palpably involves the location and organization of a considerable number of separate yet associate institutions at the most desirable sites to be found throughout the country; the selection of a central medical board, and of a local auxiliary board in every city and town of any size, these boards to be composed of progressive and representative physicians, who would enter into the spirit of the movement with some degree of professional enthusiasm, and who in their respective localities would act as referees, advisors, and examiners for the system. Such a body of medical experts as could be selected to compose these boards would unquestionably command the respect and unhesitant confidence of the entire community. Their examinations and advice, unbiassed by narrow prejudices or by personal interests and preferences, would be universally accepted, and would serve to prevent the sending of applicants to climates and locations manifestly unsuited to their individual conditions. This latter item of itself would be a great advance over the present practice. In the composition of these boards, if only men of broad culture, liberal

views and genuine professional honor be allowed to acquire influence in connection with the management, and if medico-political cliques can be rigidly avoided, there need be no difficulty in securing the requisite degree of professional harmony.

It can hardly be doubted that such a system of sanatoria, intelligently organized on thorough business principles and directed by good and earnest men—of whom there is no dearth in the profession—would be accorded a patronage unprecedented in the history of medicine, or rather in the history of health-seeking. The country is full of invalids, and doubtless always will be. At present not one in ten of those who ought to be in some well-equipped institution, specially adapted to their conditions, can be persuaded to present himself for treatment, for the very cogent reason that, considering the cost, commensurate results are not sufficiently promising, or because the various and contradictory advice vouchsafed by different authorities is so bewildering that he comes to lose faith in all climates, localities and institutions. On the other hand, under the proposed system, each locality would have its board of three, five or more skilled physicians, before whom applicants could go with every assurance that in giving advice their cases would be fully investigated and their future interests carefully conserved.

Again, under such a systematic and eminently rational arrangement many of those absolutely hopeless cases, now either selfishly or injudiciously sent away from home and friends only to quickly decline and die, would be frankly and considerately advised to spare themselves the risk, fatigue and expense of a worse than fruitless journey. While this course should unquestionably be universally followed for the reason that it is infinitely more humane to all such patients, it would also prove far better for the reputations of sanatory institutions. On the other hand, hundreds of cases unquestionably amenable to systematic treatment at a well-regulated sanatorium, but which, for reasons indicated, do not now seek these institutions, under such advice as has been outlined would eagerly and early apply for care and treatment. Thus, while the patronage would be constantly and substantially increased, its general character would at the same time be materially improved by the exclusion of patients in the last or hopeless stages, as also those afflicted with incurable diseases, cases whose presence in any, except it be a special institution, results in no good to them, while it acts as a serious depressant and menace to others.

Theoretically the foregoing suggestions seem plausible. Can they be made to materialize?

It has passed into a proverb that doctors are neither capitalists nor good business managers; but, as with all such sweeping rules, there must be plenty of exceptions. Capitalists are not presumed to appreciate all the sanitary and scientific arguments adduced; they demand commercial proofs. But if barely one per cent. of the active practitioners of the United States would combine, each contributing his influence and a very modest amount of spare capital, such a promising nucleus would be secured that plenty of capital would soon be found seeking the investment.

If the proposition seems chimerical on account of its implied financial magnitude, what shall we say of the numerous quack medicine schemes that are so readily floated in the stock market, each on the basis of several millions of capital stock?

Gentlemen of the profession, are you ready for the question?

A CRITICAL STUDY OF THE MAIN DEFECTS OF JAVAL'S OPHTHALMOMETER.

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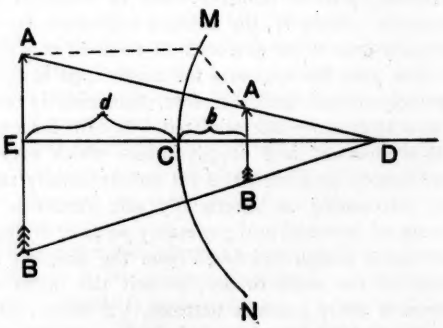
JAVAL'S ophthalmometer was first brought before the profession about a decade ago with the claim that it enabled the ophthalmologist to determine corneal astigmatism objectively to within a quarter of a diopter. This claim seems now to be conceded by many members of the profession; but I think it will be clear after the following exposition that such a claim is *untenable*, especially according to Javal's own mathematic method, and that it is only by accident (*sit venia verbo!*) that this claim has been partially substantiated in practice.

FIG. 1.



To understand this seemingly paradoxic statement I must ask my readers to glance at a few mathematic formulæ. First, however, let us recall the method of finding the radius of curvature of a convex mirror, such as the anterior part of the cornea is.

If A B (Fig. 1) be the object, at a right angle to the optic axis E D; if M N be the surface of the convex mirror, the center of which lies at D, and

if E C = d and the distance of the image A' B' from M N = b, then we have

$$(I)\ \frac{1}{d} - \frac{1}{b} = -\frac{2}{r}\ (\text{if } r = \text{C D}),$$

and further,

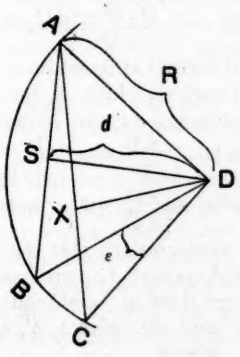
$$(II)\ \frac{\text{A B}}{\text{A' B'}} = \frac{d+r}{r-b} = \frac{\text{Size of object}}{\text{Size of image}} = \frac{\text{O}}{\text{I}}.$$

If we express r in equation (II) in terms of d and b of (I), we get $\frac{\text{O}}{\text{I}} = \frac{d}{b}$, or expressing here b in terms of d and r by equation (I) we have $\frac{\text{O}}{\text{I}} = \frac{2d+r}{r}$ (III).

Now, here lies the *first inaccuracy of Javal*, for he makes $\frac{\text{O}}{\text{I}} = \frac{2d}{r}$, which is right only if the object lies so far from the mirror that its image falls at the focus of the mirror, which is at $\frac{r}{2}$. Really, Helmholtz did use the formula $\frac{\text{O}}{\text{I}} = \frac{2\,d}{r}$ because he placed his object at 2000 mm. from the cornea, while Javal makes d = only 280 mm. To prove the inaccuracy we have only to remember that Javal's instrument is so constructed that the image, I, always = 3 mm. as soon as the two reflectors have been moved so that their two inner images touch. Therefore, $\frac{\text{O}}{\text{I}} = \frac{2\,d}{r}$ becomes $\frac{\text{O}}{3} = \frac{560}{7.8}$, as r, the average radius of curvature of the cornea, equals 7.8 mm. Then O = 216, while by using $\frac{\text{O}}{\text{I}} = \frac{2\,d+r}{r}$ we get O = 219 mm., which is a difference of about 1.5 per cent.

Another inaccuracy of Javal's instrument arises from the fact that his reflectors slide on an arc, for

FIG. 2.



this sliding changes d continually, as will be easily seen by the following diagram (Fig. 2). Here A B C is the arc on which the reflectors are moved. Suppose, now, that the one slider has to be moved from B to C to get contact of their images, then d will change also. It will become R cos $\left(\alpha + \frac{\varepsilon}{2}\right)$, if R = A D, or the distance of the arc from the cornea, and α the primary angle A D S, and ε the angle between B D and C D. Javal, however, makes d = R cos α a constant quantity all through his calculation. One may object to this criticism as being very trivial, and, indeed, numerically it does not amount to much; but it must be mentioned here, because it can be so easily remedied that it is astonishing that it escaped Javal's mind.

The *main error of Javal*, however, lies in the following: In his own description of his instrument he states that f, the focal distance of the cornea, $= \frac{r}{n-1}$, if r is the radius of the cornea and n the index of refraction of the cornea and aqueous humor. Now, as we want to find the refractive power of the cornea for rays coming from the outer world, it is undoubtedly true that f can only = $\frac{rn}{n-1}$, for this alone tells us how far back from the anterior surface of the cornea parallel rays from distant objects would meet. Or, if we express it in diopters, then we must say, the refractive power of the cornea $\text{D} = \frac{1000}{f} = \frac{1000\,(n-1)}{rn}$. *This* is the right formula, and *not Javal's*, whose expression for D is $\text{D} = \frac{1000\,(n-1)}{r}$. The following table will illustrate the difference:

43.1 D of Javal ought to be	32.3 D for r =	7.8 mm.
40.5 D " " "	30.3 D for r =	8.3 mm.
37.1 D " " "	27.7 D for r =	8.8 mm.
30 D " " "	22.5 D for r =	11.2 mm., etc.

Now, it may be said that the question is not so much as to the absolute refractive power of the cornea, but the difference between those powers in the different meridians, or the amount of astigmatism. But it must be replied that the amount of astigmatism is affected also, as is shown by the following examples:

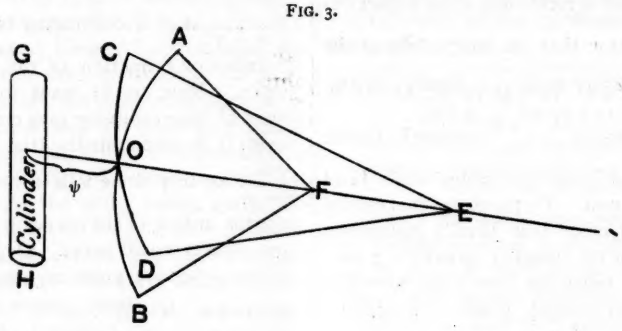
6 D astig. of Javal only	= 4.6 D	astig. of cornea.
3.4 D " " "	= 2.6 D	" "
2.6 D " " "	= 2 D	" "
1 D " " "	= 0.74 D	" "

In short, all the values of Javal for the amount of refractive power of the cornea and the amount of corneal astigmatism are n times too large, if n = index of refraction = 1.337.

"But how is that?" the impatient reader will ask. "Does not clinical experience show that Javal's instrument does often give very good results?" I answer, Yes, often, but not always; and must add that this result is not obtained by the right calculation, but results very strangely from

accidental causes, as follows: It is well known that the value of a lens changes with regard to its optic effect on the eye according to the position the lens occupies. Now, if Javal were right in his calculation, so that his instrument showed the real astigmatism of the cornea, then quite a different glass would have to be used at 15 mm. from the cornea, the anterior focal point of the eye, where our lenses ought to be placed. Still we use Javal's numbers even at that distance from the eye, which shows plainly that his calculations for the integral corneal astigmatism must be wrong. To make this more clear let us look at the following figure (Fig. 3): Let A B

FIG. 3.



be the vertical and C D the horizontal meridians of the cornea, which are of differing curvatures, so that F is the focus of the rays through the vertical and E the focus of those through the horizontal meridian. If the refractive power of the cornea in the horizontal meridian = D diopters, and that of the vertical = D′ diopters, if D′ is supposed to be greater than D, what lens have we to place at the anterior focal point of the eye at the distance of ϕ mm. from the cornea, or, more correctly, from the first principal point of the eye, in order to make the combined refractive power of a cylindrical lens and the cornea in the horizontal meridian equal to that same power in the vertical meridian? To simplify the problem, however, let us put the cylinder, not at ϕ, but at the *anterior* focal point of the *cornea*, which is $= \frac{r}{n-1} = \frac{7.8}{0.437} = 23$ mm., while ϕ would be about 15 mm. from the cornea. Now, it is well known that if a lens is placed at the anterior focal point of an optic system, the second principal point, and with it the second principal focus, of the combined system is obtained by moving these points of the given system in the same direction through the same definite extent. In our example the second principal point lies, together with the first principal point, at the apex of the cornea, and it is moved through $\frac{\psi\,\psi'}{f}$ mm. away from the cornea, if ψ and ψ' are the anterior and posterior foci of the cornea and f the focal distance of lens or cylinder. As we want the rays through C D also to come to a focus at F, we have to choose our lens so that

$$F\,E = \frac{\psi\,\psi'}{f} = \frac{\psi \times 1000}{f\,D}, \text{ because } D = \frac{1000}{\psi'}.$$

This we may write

$$F\,E = \frac{\psi\,D_L}{D}, \text{ if we mean by } D_L = \frac{1000}{f}, \text{ the refractive power of the cylinder in that meridian. Further, it is clear that F E, the focal interval, } = \frac{1000}{D} - \frac{1000}{D'},$$

as $O\,E = \frac{1000}{D}$ and $O\,F = \frac{1000}{D'}$. Therefore, we have now $\frac{1000}{D} - \frac{1000}{D'} = \frac{\psi\,D_L}{D} = \frac{1000\,(D'-D)}{D\,D'}$

And as $\psi = \frac{r}{n-1}$ and $D = \frac{1000\,(n-1)}{r\,n}$, we can write for $\frac{\psi}{D}$ the value $\frac{1000}{D^2\,n}$, so that we have

$$\frac{1000\,(D'-D)}{D\,D'} = \frac{1000\,D_L}{n\,D^2}, \text{ or } \frac{D'-D}{D'} = \frac{D_L}{n\,D}.$$

Therefore, $D_L = \frac{n\,D\,(D'-D)}{D'}$, if $D'-D =$ the amount of real corneal astigmatism $= d$. The value of our lens, therefore, which, at the anterior focal point of the cornea = 23 mm., corrects the corneal astigmatism, is $D_L = \frac{n\,D}{D'}\,d = \frac{n\,(D'-d)}{D'}\,d$. This we may write $D_L = \frac{n\,D}{n\,D'}\,n\,d$; and as we know from former considerations that the real values of astigmatism and corneal diopters have to be multiplied by n to get those of Javal, and if the respective values of Javal are called Δ, Δ', and δ, we have $D_L = \frac{\Delta}{\Delta'}\,\delta = \frac{\Delta'-\delta}{\Delta'}\,\delta = \delta\,\frac{\Delta}{\Delta+\delta}$. Now, usually $\frac{\Delta}{\Delta+\delta}$ is not much different from 1, and so we get approximately $D_L = \delta$, if $\delta =$ Javal's astigmatism. Suppose, for example, that there was a real corneal astigmatism of 3 D, then Javal's instrument would

indicate an astigmatism of 4 Δ, while the real correction at 23 mm. would be a cylinder of 3.6 D. So 1 real D would be 1.337 of Javal = 1.19 at 23 mm. if the meridian of lowest curvature was 37.1 Δ. These values would change a little if the lens were placed at 15 mm. away from the cornea—*e. g.*, 3.6 D at 23 mm. would be 3.7 D at 15 mm. In the higher forms of astigmatism, however, the difference is very considerable; for, suppose that Javal's instrument showed 8 Δ astigmatism, then this would equal 6.5 D at 23 mm. from the eye and 6.8 D at 15 mm. away from the eye, so that between Javal's glass and the true cylinder there would be a difference of about 1.25 D, certainly a very considerable amount. In the same way, Javal's 6 would be equal to a 5 cylinder.

Another inaccuracy must be mentioned still, with reference to the graded reflector, where each step is supposed to indicate one diopter. To get the size of those steps Javal uses the formula $\Delta = \frac{1000\,(n-1)\,O}{2\,d\,I}$ where d is the distance of the object O from the cornea, while the right formula would be

$$D = \frac{1000\,(n-1)\,(O-I)}{2\,d\,n\,I}.$$

Now, Javal makes *d about* 281 mm. in his latest model (it changes continually, as already proved), and I = 3 mm.; and as $n = 1.337$ we get

$$\Delta = \frac{337 \times O}{281 \times 6} \text{ and } 1 = \frac{337 \times O}{281 \times 6} = \frac{O}{5},$$

from which it follows that O = 5 mm. for each diopter, while from the true formula

$$D = \frac{1000\,(n-1)\,(O-I)}{2\,d\,n\,I}$$

it follows that the object O ought to increase 6.7 mm. for each diopter. But while Javal is right in making the steps of his reflector = 5 mm. each for *his own* diopters, he is wrong in making those reflectors curved, because each step has then less value than 5 mm. as measured in the line of union of the two reflectors.

So far, all the objections raised have nothing to do with the principle of the instrument, but only with the special form given to it by Javal. For it must not be forgotten that the instrument is almost the same as that described by Rochon in the *Journal de Phys.*, vol. liii, in 1801, and that it has a good place in science under the name of Rochon's micrometer. Javal only gave the bi-refracting prism a definite place in the telescope and then made the calculation for the refractive power of the cornea, adding an arc and two reflectors. Now, the calculation and the arc, as well as the two reflectors, are not quite correct, but the error might be easily rectified, and so a more perfect ophthalmometer on Rochon's principle be constructed. But it seems to me that there is a serious defect in the very principle of the instrument, because the bi-refracting quartz-prism is not achromatic, so that the margins of the images are not sharply defined, which makes it impossible to get the accurate contact so necessary for an accurate result.

THE BLENDED TOCCI BROTHERS, OF LOCANA, ITALY.[1]

BY ROBERT P. HARRIS, M.D.,
OF PHILADELPHIA.

[Dr. Harris brought to the notice of the College an enlarged photograph of this remarkable monstrosity, which had been prepared for the Mütter Museum at the desire of its curator, and made the following remarks.]

WE have here a nude representation of what we must regard as the most remarkable duplex monstrosity that the world has seen since the death, three hundred and seventy-four years ago, of their Scotch analogue, which had reached the age of twenty-eight years. This peculiar type of blended twins appears, on an average, twice in a century, as there have been about a dozen in the last six hundred years, and but two in the current century. The most remarkable feature about the Locana twins is that they are living and in good health at the age of fourteen and a half years, and bid fair to reach mature age, because of the perfection and independence of their thoracic and abdominal viscera. In the last six hundred years but two monstrosities of the same type have lived out their first year; and this early mortality we must attribute to a want of internal anatomic symmetry, and particularly to an abnormal construction of the heart and distribution of the bloodvessels in one twin. It is doubtful if united twins are ever equals in mental and physical vigor, and the Tocci Brothers are as nearly alike in health and strength as has been the case in the subjects that have lived the longest.

The photograph before us represents the boys in a standing position, but it will be seen at once that they are mainly sustained in it by the use of their arms, and that this is more markedly the case with the left twin, whose shoulder is forced upward, because of the weak support given by his club-foot and imperfectly developed leg.

These twins were born in Piedmontese Italy, on October 4, 1877, after a labor of eight hours, under a midwife, the head of the right boy, Giovanni, coming first; and he appears to have held that relative position, in a mental sense, ever since. Giacomo's head soon followed, and then came the double thorax, a single abdomen, one pair of legs, and a single placenta. Nothing was said about the cord, except that there was but one; but it was no doubt composed of six vessels—four arteries and two

[1] Read before the College of Physicians of Philadelphia, May 4, 1892.

veins. The twins weighed eight and three-quarters pounds when a month old, and probably a pound less at birth. When three years old, as shown by a photograph, they had narrow shoulders, a corpulent abdomen, and, for their age, large testicles. Giovanni had a long face and a girl-like appearance, but his head-circumference has always been a little the larger of the two.

These xiphodidymi belong to the class that is distinguished by having two heads, four arms, and only two legs. In general outline they resemble, when their legs are together, a letter Y—the heads, shoulders, and chests down to the sixth ribs making the V, and the abdomen and legs the I, or stem. Their present weight is ninety-five pounds, which is about that of a healthy, robust boy of their age. Their arms having much more exercise than their legs, are larger, in proportion to their age, than the latter; and the glutei muscles of Giacomo are badly developed, because of his talipes equino-varus, and consequent inability to develop them by exercise. Single boys of fourteen, as a rule, have much better developed legs than arms, which led to the expression in war times: "Better fitted for running away than handling a musket." But the Tocci boys are the reverse of this in strength.

If we had a back view of the monstrosity, it would show their two inner arms crossing each other over to their outer shoulders, in the position in which they usually hold them; two converging spinal sulci extending down to two sacra; two outer nates as in a single subject, and two little rudimentary nates, with a cleft between them, located over the intra-sacral symphysis. They have no rudimentary nodule to represent an attempt at the formation of a third leg, as has been found in some analogues.

As they look at you, the two boys are quite different in facial contour, and Giovanni is generally credited with having the better mind; but their faces in profile bear a closer resemblance. They have fair skins, and at times a rosy color, and thick, brown hair. Their bodies are short, and they are below the medium height for their years. Their acial expression is not a happy one, when in repose, and reminded me of what I have noticed in boys having deformed feet—a shame-faced look.

In measure of health the twins compare well with normal children of their own sex, having had but little sickness since birth, and not having lost a day therefrom since they commenced to exhibit themselves in the United States, six months ago.

Giovanni is the stronger and more erect of the two, has the better ear for music, learns a foreign language the more readily, and is generally the more intelligent. He has a natural talent for drawing, and is devoted to making pictures of our domestic animals, such as the horse, cow, etc., and of some of the savage quadrupeds, as of the lion and tiger. Giacomo is the critic in art, although drawing but little, and his taste is for caricatures. The brothers converse a great deal together. They are both right-handed, although one might have supposed that Giacomo would have naturally preferred his free arm, the left.

The boys have each two lungs, the outer being the larger, and are forced to breathe largely by their diaphragms. They have separate and distinct hearts, located in the left chest-cavity respectively, and these hearts are believed to be normal in structure. Giovanni feels his heart beating on the left side—and if either boy had an abnormal cardiac structure, he should be the one, yet his color and health indicate the contrary. The cardiac beats are not synchronous, and one heart generally pulsates a little more quickly than the other.

They have two stomachs, and that of Giovanni is said to be reversed, the greater curvature being to the right, as was the case in Rita, of the Sassari girls of 1829. I was not permitted to verify this, because of the opposition of the father. These two stomachs are as independent functionally as if they occupied two different abdomens. Recently, when travelling by railroad, one of the boys became very pale, and directly vomited the contents of his stomach,[1] while the other was so entirely free from nausea that he laughed at his brother for his mishap. One brother may wake up hungry, drink a cup of coffee, and eat something, while the other remains asleep. The two stomachs do not appear to be influenced in the least by being in contact, but only by their respec tive pneumogastric nerves.

There are evidently two sets of intestines—large and small. One boy can have a desire to defecate when the other has not; and this is particularly the case when one has diarrhea, in which event only he has a discharge, while the other is passive. There must therefore be two colons, as were found on autopsy in the Padua boys of 1691. They have probably a common rectum, as had also the Padua analogue; but it is possible that this part of the bowel may be bifid, which would be an interesting feature to determine by touch or speculum. The twins, from habit and convenience, defecate almost always at the same time.

They have two bladders and one urethra, as had also the Padua boys, although they usually urinate together. As their tastes for food and desire for drink are not the same, one boy may be awakened from his sleep in the morning by a distended bladder and empty it without waking up the other, in whom the kidneys have been less active.

My catechetic examinations made last month

[1] This was repeated by Giacomo in public on April 23, 1892, at the Dime Museum, Philadelphia.

confirm the opinions respecting the anatomy of the twins that were formed after auscultation, percussion, and a knowledge of their habits, by Drs. Fubini and Mosso, of Turin, in their second month, and by Drs. Colrat and Rebatel, of Lyons, in their thirteenth. The conjectural belief that they might have two colons has been changed into one of knowledge, as shown by their independence in defecation. In the event of an autopsy, these colons will no doubt be found of small caliber, and quite abnormal as to length and direction. We are warranted in this belief by discoveries that have already been made in the examination of dead analogues. Even the single colon of a double monster is quite abnormal.

The boys are quite differently affected by changes of temperature. Giovanni requires less underwear than his brother, and will perspire freely on a hot day, while Giacomo has a dry skin. Either brother may be seized with an attack of coryza, as the effect of a direct wind-draught, when the other entirely escapes. They sleep upon the back—or, more correctly, each is in a dorso-lateral position, and places the side or back of his head upon the pillow. They usually sleep eight or nine hours continuously. For a change of position they sometimes turn over upon their abdomen for a short time, but never sleep in this form of decubitus.

A prick with a pin in the median line of union is felt by both brothers, but the sensation is lost to one twin in passing to either side. The penis is said to have a sensation common to each, and the scrotum has a partial one beyond the median line. It is claimed that one twin feels a little when his brother's testicle is touched, which I believe to be an error, the sense being in the skin only, as the testicles are supplied with nerves through the inguinal canal. The penis and testicles are in an undeveloped state, being small for their age. The penis becomes erect, but the boys have no knowledge of its sexual function.

The two legs are entirely independent, and each belongs to, and is controlled by, the boy whose head is on the same side. One boy does not feel a touch upon the other boy's leg, and has no power, by his will, to give it the least motion. It is possible that the twins might balance themselves so as to stand, as their Scotch analogue is said to have done, if the leg and foot of Giacomo were as well formed as those of Giovanni, and had the same degree of strength that the latter appear to have.

Whether the boys have two separate livers, or a double one with two gall-bladders, has not yet been ascertained, for want of permission to make the required examination. Having two bladders, they may have two pairs of vesiculæ seminales, but are more likely to have one to each bladder, with one vas deferens and one ejaculatory duct, as this would be in correspondence with the existence of one testicle to the owner of each bladder, and one urethra for the exit of the ducts. I find no reference to the seminal vesicles in any reports of autopsies made in male analogues.

With regard to the other viscera, we can only form an inferential opinion, as follows: The spleens are small, and located right and left to correspond with the positions of the stomachs. The pancreases have their heads facing each other, to correspond with the curve of each duodenum. The kidneys are in two pairs, the outer being large and the inner being small, or, perhaps, rudimentary. It is rare to find no trace of the two inner kidneys when the spinal columns are well separated so as to give space for them.

I see no reason why these Tocci boys may not live a number of years yet. Giovanni is the stronger, mentally and physically, but the difference is not marked, and no special element of weakness likely to shorten life appears to have been discovered in Giacomo. They have both learned a certain measure of French and German, and can both sing, Giovanni having the higher-pitched voice. One of the Scotch twins already mentioned as having reached the age of twenty-eight is recorded as having been quite stupid when compared to his brother. We have no such difference to record here.

THE VALUE OF MILK-LABORATORIES FOR THE ADVANCEMENT OF OUR KNOWLEDGE OF ARTIFICIAL FEEDING.[1]

BY T. M. ROTCH, M.D.,
OF BOSTON,
ASSISTANT PROFESSOR OF DISEASES OF CHILDREN, HARVARD UNIVERSITY; VISITING PHYSICIAN TO THE BOSTON CITY HOSPITAL, TO THE CHILDREN'S HOSPITAL, AND TO THE INFANTS' HOSPITAL.

Two important factors are demanded by physicians of the present day in solving the problem of rational medicine: First, a means of saving time; second, exact methods of work.

I have long felt that the artificial feeding of infants should be reduced to a more exact system, and that in this way an endeavor should be made to rescue this important branch of pediatrics from the pretensions of proprietary foods and the hands of ignorant nurses. With this purpose in view I have established a laboratory in which the materials used are clean, sterile, and exact in their percentages, and are combined in any proportion that the physician may wish to prescribe. Laboratories of this kind should be established everywhere, and physicians should write prescriptions for their infant patient's food and put them in the hands of the milk-modifier in his laboratory, just as they

[1] Abstract of a paper read before the American Pediatric Society, May 4, 1892.

write for combinations of drugs in disease, and entrust them to the pharmacist in his drug-shop. As the result of clinical experience in infant-feeding I have reached the conclusion that slight changes in the percentages of the three elements of milk, of which we have most accurate knowledge, namely the fat, sugar, and albuminoids, have an important bearing upon the management of the digestion and nutrition of infants.

In analyses of milk from seven women the fat, sugar, and albuminoids varied to a marked degree, and yet the infants all digested well and throve on their individual percentages, while what agreed with one produced serious symptoms in another. It seems, therefore, that so far as milk is counted upon as a food, it should be understood to be a general name of the food for the infant, just as dinner is a general name of food for the adult.

This general dinner (milk) of the infant should also be modified in its various parts to suit the digestion of the individual infant.

Perhaps it would be of interest to know what materials were needed, and what processes were gone through with in carrying out the prescription of the physician.

A laboratory such as that described has already been established in Boston, and is in successful operation, a number of physicians having found it to be an indispensable adjunct to their daily practice.

An important matter is the careful supervision of herds of cows especially selected as to breed and systematically fed, so that the analysis of their milk should be of an almost unvarying percentage. The morning's milk of these cows, milked into glass and kept scrupulously clean, is rapidly cooled and in a few hours delivered at the laboratory. The atmosphere of the laboratory is kept pure and fresh by means of a large fan that keeps up a constant outward current of air. The laboratory itself is lined with white tiles, and contains a separator by means of which a stable 16 per cent. cream can be quickly obtained from the milk. There is also a large sterilizer into which not only steam can be introduced, but in which the milk can be exposed to high or low temperatures, at the will of the modifier.

Having once obtained a pure, clean skimmed milk and cream of a stable percentage, it is merely a matter of mathematic calculation to combine these fluids in such proportions as to produce a mixture in the percentages of fats and albuminoids prescribed by the physician.

The sugar percentage is obtained in like manner by using a carefully prepared 20 per cent. solution of milk sugar and distilled water.

Diagrams were made to show the prescriptions written by the physicians in fat, sugar, and albuminoid percentages, the same prescriptions translated into drams and ounces by the milk-modifier, and the figures returned by the chemist to whom the modified milk was sent to test the accuracy of the modifier's calculations.

I have had a large number of test analyses made, so that there is no longer a doubt but that fairly exact combinations can be made in this way.

As the chemistry of the mineral matter in woman's milk is so little known, it is better to ignore that element for the present. Three figures only need be remembered, corresponding to the percentages of fat, sugar, and albuminoids in average human milk—namely, 4, 7, and 1.50.

Starting with these figures the physician can then easily change one or more of them, either to increase or decrease, according to the need of the especial infant.

As objection has been made to sterilizing at 212° F., this could just as well be done at the safer and lower temperature of 167° F. in the laboratory sterilizer.

THERAPEUTIC NOTES.

For Burns.—

℞.—Iodoformi . . . . . 1 part.
Acid. boric. } . . . āā 5 parts.
Antipyrin. }
Vaselin. . . . . 50 "
M. et ft. ung.
S.—Apply topically.

RECLUS, *La Sem. Méd.*, No. 17.

For Pruritus.—

℞.—Menthol. . . . . gr. xij.
Alcohol. . . . . f ℥jss.
Aquæ destil. . . . . f ℥iij.
Acid. acetic. . . . . f ℥j.—M.
S.—Apply with a sponge.

La Méd. Mod., No. 10; *Münch. med. Woch.*, No. 15.

Non-bitter Quinine.—

℞.—Quininæ sulphat. . . . gr. xv.
Acid. sulphuric. dilut. . . . ♏xv.
Spts. menth. piper. . . . f ℥ijss.
Solutio. saccharin. saturat. . . f ℥v.
Aquæ destillat. . . . . f ℥vj.—M.

Journ. de Méd. de Paris.

The Treatment of Fecal Impaction by Means of Galvanism.—SOUTAKIS (*Gaz. Méd. d'Orient*, 1892, p. 20) reports the case of a woman, sixty-three years old, in whom constipation had existed for five days, with symptoms of fecal impaction. Ordinary remedies had been employed, but without avail. Repeated intrarectal applications of galvanism, by means of a suitable sound, were followed by active intestinal peristalsis, and the evacuation of a large quantity of scybalous fecal matter.

THE MEDICAL NEWS.

A WEEKLY JOURNAL

OF MEDICAL SCIENCE.

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1004 WALNUT STREET,
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Subscription Price, Including Postage in North America.

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PHILADELPHIA.

SATURDAY, JUNE 4, 1892.

THE "MEDICAL MIRROR" ON NOSTRUMS.

AN esteemed contemporary applies the following elegant epithets to those that believe the medical profession should not become a mere appendage to the trade of the drug-manufacturer, and that selling nostrums is not quite the same as the healing and prophylaxis of disease: "Two-for-a-nickle," "small-bore," "small-bores half-and-half," "shoddy pretenders of the medical profession," "bombastic boasters and pretenders," "hump-backed members," etc. We have no doubt the superior perception of the readers of our urbane co-laborer will enable them to understand how "pharisaism" may be "ethical," and also to distinguish clearly the subtle difference, hidden from us, between "small-bores," and "small-bores half-and-half."

But such evidences as these of "local color" are introductory to the charmingly naïve explanation that the opposition of the "hump-backed" is solely a question of sour-grapes. The "two-for-a-nickel," our contemporary avers, are disgruntled, because they have no practice or standing "in their own bailiwick," and having no practice, they have not been asked to give their opinion of the "so-called proprietary medicines" made by "the practical, pushing pharmaceutical world," which has "secured good traveling men to present their supplies to the profession, having convinced them [*sic*] favorably through the medium of medical journals and attractive circulars." This is delicious! Barkis was, certainly, never more willin', nor ever more regardless of English grammar.

Somewhere, we have seen an amusing and suggestive toy. It also was a mirror, of convex, cylindrical pattern, placed at an axis of 180°. Looking a little steadily at it, behind one's own ludicrously distorted image, the eye caught another reflection of the figure of a squat Chinese caricature, wagging its head with a satyr's grin. The real china figure above, cunningly reflected in the distortion mirror, would smile and bow continual assent for several minutes, for so small an amount as a penny placed in its huge mouth; but, the larger the coin the more wide-mouthed the cunning grin, the more energetic, subservient, and long-lasting the bows!

* * * * *

How easy it is to ascribe mean motives to those who may oppose our own pet vice. The spoilsman in politics cannot comprehend the high-principled devotion that places public welfare above partisanship, and straightway he raises the cry of "Pharisee!" The spoilsman in medicine, without the faintest glimmer of the pure light that illumines the soul of the true physician, is roused to frenzy by the exposure of his methods, and spits out of the blackness, venom that falls harmlessly wide of its mark. That was shrewd advice of the old lawyer to his son: "When law and justice are both against you, talk around the case and abuse the plaintiff's attorney." The advice has not been wasted on *The Medical Mirror*.

But what can the *Mirror* expect to gain by its adoption of the methods of the pettifogger? The issue to be presented at Detroit to the representatives of American medicine is clear-cut and direct. Not any individual, but the largest County Society and the largest State Society in affiliation with the American Medical Association will, by the unanimous action of well-attended meetings, appear as plaintiffs. The nostrum manufacturers and their journalistic allies cannot well hope to silence by slander two such bodies.

The law is plain. Section 5 of that article of the Code of Ethics which treats of "Duties for the Support of Professional Character," declares it to be "reprehensible for physicians to give certificates attesting the efficacy of patent or secret medicines or in any way to promote the use of them."

Justice is on the same side, "for"—to quote the same section of the same Code of Ethics—"if such nostrum be of real efficacy any concealment regarding it is inconsistent with beneficence and with professional liberality, and if mystery alone give it value and importance, such craft implies either disgraceful ignorance or fraudulent avarice."

Columns of abuse and vituperation cannot obscure these luminous facts. The code is still the unrepealed law of the American Medical Association; and whoever claims good standing in that Association must be prepared to prove his obedience to the law. Most certainly the trustees of *The Journal* should be held to strict accountability in their management of that sacred trust.

If the law is oppressive let the open attempt be made to repeal it. How hopeless such an attempt would be, *The Mirror* and the nostrum-makers well know, or long ere this it would have been made. The law cannot be repealed, for it is founded on a principle that is indeed antiquated but can never become obsolete, on the eternal principle of right. The terse language of the code expresses this beyond the necessity of a single added word.

SOCIETY PROCEEDINGS.

ASSOCIATION OF AMERICAN PHYSICIANS.

Seventh Annual Meeting, held at Washington, D. C., May 24, 25, 26, 1892.

(Continued from page 615.)

SECOND DAY—MAY 25TH.

DR. F. T. MILES, of Baltimore, reported "A Case Presenting the Symptoms of Landry's Paralysis, with Recovery." The condition was thought to be dependent upon a polyneuritis. The clinical picture bore a close resemblance to that of acute ascending paralysis. It was especially noted that the faradic contractility was preserved. The paralysis was of gradual onset, progressively invading the body from below upward. There was an absence of pain, spontaneous or upon pressure. The full text of the paper is to appear in a subsequent number of THE NEWS.

DR. ALEXANDER MCPHEDRAN, of Toronto, reported "A Case Showing the Symptoms of Landry's Paralysis; Recovering." A clerk, twenty-six years old, with the exception of malarial fever fifteen years ago had always been healthy. His present illness began December 2, 1891. For three or four days before this, he had noticed uncomfortable sensations in the feet, which he supposed to be due to his boots. On the evening of December 2d, after stooping to close a safe, he found it difficult to rise again to the erect position. On the following morning, on rising, he found his legs to be very weak; he was able to dress and walk down stairs, but had immediately to lie down on a sofa. While dressing, he first found trouble in the use of his hands, and then some muscular pains in the forearms and shoulders. The electric reactions were normal. On December 4th, the paralysis of all the extremities was complete. The muscles of the trunk and neck were also involved, so that the head could scarcely be raised from the pillow. Speech, swallowing, and breathing were unaffected; sensation was normal; the bladder and the rectum acted normally; the knee-jerk was absent. On December 10th, the speech became somewhat thick. No other change was noted in the symptoms. On December 12th, swallowing was slightly affected, so that there was considerable difficulty in taking soft food. This difficulty soon improved and disappeared in a few days. On December 13th, some pain was felt in the lumbar region; this was relieved by heat, but recurred frequently for a week. On December 20th, the reflexes were still absent; there was no wasting; no tendency to bedsores; the man was able to move his hands and forearms slightly. On January 1st, motility had to a slight degree returned in all of the extremities, being most advanced in the upper. The patient was able to maintain the sitting posture in an arm-chair and to hold the head erect for a few minutes without support. The knee-jerk was quite distinct on the right and slightly developed on the left. On February 3d, the man was able to walk a few steps unsupported; he used his hands freely, though the muscular power was still deficient. He continued to improve, and was soon able to walk freely; the knee-jerk became somewhat exaggerated; there was no ankle-clonus. Sitting with his elbows resting on the arms of his chair and fingers extended, there was marked tremor of the forearms and hands while the position was maintained. On April 20th, the man appeared vigorous and walked well, but if he allowed the knees to bend much they would give way under him; the knee-jerk was increased. The electric reactions continued normal throughout. The spleen could not be felt at any time, although the area of dulness was slightly increased.

In the discussion, DR. CARY, of Buffalo, reported a case in which there was paralysis of the lower extremities and of the sphincters and finally paralysis of the upper extremities, with interference with the respiration, so that suffocation was feared. The pulse rose to 130 per minute. The power of deglutition and of phonation was lost. The symptoms lasted for two or three days, when improvement set in and the condition gradually subsided in the way in which it began. At the expiration of a year the man was about well. The case was considered one of Landry's paralysis by several physicians by whom it was seen.

DR. THOMSON expressed the view that the involvement of the sphincters would seem to exclude the case as one of acute ascending paralysis.

DR. M. ALLEN STARR, of New York, presented a paper entitled "Local Anesthesia as a Guide in the Diagnosis of Lesions of the Lower Spinal Cord." He maintained that in testing sensibility it is not enough to ask a patient whether he feels the touch of the cotton-wool, or the tip of the finger, or the warm or cold test-tube, or the prick of the needle, or the sting of a faradic brush; nor is it sufficient to touch two parts successively, and demand that he compare a sensation with a memory. He should always be tested upon two surfaces simulta-

neously, and asked if any difference is felt between the sensations.

In spinal affections the face is a convenient surface with which to make comparisons; and in the diseases of the lower region of the cord, the arms and trunk may be used as a standard of normal feeling.

Dr. Starr reported twelve cases that he had collected, including six that he had himself observed, in which lesions of the spinal cord were attended with definite areas of anesthesia. From a study of these he endeavored to show that a limited area of anesthesia is produced by a limited lesion in the spinal cord; that as the lesion ascends the cord from its lowest limit, the area of anesthesia extends in a definite manner upon the surface of the body; and that the situation and shape of the area of anesthesia is a positive indication of the level of the lesion in the spinal cord. It appears that, as the centers of control of the bladder and rectum are uniformly affected together, they must be adjacent to one another. The control of the sphincters is lost when the lesion involves the lower three sacral segments, and the centers probably lie in the lower two segments of the cord. Seven concentric zones of anesthesia were determined in conjunction with lesions of the lower part of the spinal cord.

The *first zone* is oval-shaped, small in extent, and includes the perineum, the posterior part of the scrotum in males, the vagina in females. It also includes the mucous membrane of the rectum.

The *second zone* is heart-shaped, with the apex above, and includes the entire scrotum and posterior surface of the penis and mucous membrane of the urethra in males—the entire genitals of the female, except the outer surface of the labia majora and the mons veneris.

The *third zone* involves a greater surface of the buttocks and extends down the back of the thighs over a triangular area, the apex of which is directed downward. This has been named the "saddle-shaped area," approximately coinciding with the surface of the seat in contact with the saddle when riding. A zone of anesthesia of this shape is due to a lesion involving the fifth, fourth, and third sacral segments.

The *fourth zone* is of a similar shape to the third, but more extensive, a greater surface on the back of the thighs being involved; and the anesthesia extends in a band almost as low as the popliteal space. As the smaller zone is due to a lesion at the third sacral segment, and the next larger zone is due to a lesion in the fifth lumbar segment, it is allowable to conclude that this region corresponds with the second and first sacral segments.

The *fifth zone* of anesthesia includes the first four zones and extends down the back of the thigh through the popliteal space in a band, and then descends on the outer surface of the leg to the foot. In some cases it ends at the ankle, in others it involves the entire side of the foot, dorsum, and sole, and three and a half toes. When a lesion extends from the sacral into the lumbar cord the anesthesia extends from the thigh down the outer side of the leg. This area then corresponds to the fifth lumbar segment of the cord.

The *sixth zone* of anesthesia is produced by a lesion of the third lumbar segment; the entire back of the thighs and legs is anesthetic and the front of the thighs is also anesthetic, except over a funnel-shaped zone that extends from above downward, the narrow tube of the funnel reaching along the shin even to the foot. This zone will probably later be separated into two separate parts corresponding to lesions of the fourth and third lumbar segments.

The *last* and *largest zone* of anesthesia is produced by a lesion of the four lower lumbar segments—that is, by destruction of all but the first lumbar segment of the cord. The line of anesthesia is much lower in front than behind, and follows the line of Poupart's ligament. It is only when the first lumbar segment of the cord is invaded that the abdominal wall becomes anesthetic.

From this level upward the zone of anesthesia extends around the body in a girdle, and there is no difficulty in locating the level of the lesion in the dorsal cord.

In all of these lesions and areas of anesthesia, the *anus, the perineum, and the genitals are included in the insensitive region.*

It thus becomes evident that a careful study of disturbances of sensation is a valuable aid in the diagnosis of the situation of lesions in the spinal cord and cauda equina. It is, however, to be remembered that anesthesia is but one of a series of symptoms entering into that diagnosis, and that the condition of the reflexes and the power, tone and electric reactions of the muscles are not to be neglected in the examination of any case. It is only when *all* of the signs of a local lesion coincide that the diagnosis is an absolute one.

DR. MORRIS J. LEWIS presented a paper entitled "A Study of the Seasonal Relations of Chorea and Rheumatism for a Period of Fifteen Years—1876 to 1890, inclusive." The conclusions arrived at were based upon the months of onset of 1383 separate attacks of chorea observed in Philadelphia and in Boston; and of 673 separate attacks of acute articular rheumatism observed in Philadelphia. A distinct seasonal relationship was found to exist between chorea and rheumatism. There is a marked resemblance in form between the chorea and rheumatism tracings and the tracing representing the total amount of sickness present in the community per month. This monthly variation in amount of sickness is probably not a cause of the fluctuation in the chorea and rheumatism tracings, but is itself probably due to the same influence. While over-study assuredly plays a most important rôle in predisposing children to chorea, the months of greatest study, and therefore presumably of the greatest depression of bodily vigor, do not with any regularity coincide with, or even precede, the months of greatest frequency of this disease. It is more than probable that "weather" is one of the most important predisposing causes of both chorea and rheumatism, although precisely which meteorologic factor is the baneful one does not clearly appear. No one element of "weather" explains fully the fluctuations of these tracings of chorea, although in the barometer and storm statistics the relationship appears to be closer than to any other etiologic factor or factors that have, as yet, been advanced. Either this apparently close relationship must be acknowledged to have an important place in the etiology of these diseases, or else the resemblance must be considered purely accidental—a conclusion that, from a study of the tables prepared, seems most unlikely.

DR. STARR stated that from a study of 356 cases at

the Vanderbilt Clinic during the past four years, he was able to confirm the general conclusions made from the study of Dr. Lewis. He does not think overstudy a prominent cause of chorea. Sixty-five cases were ascribed to fright. In only 18 per cent. was there a history of rheumatism. It is possible that chorea is more common in the spring because disturbances of nutrition culminate in the spring.

DR. HENRY spoke of other than articular manifestations of rheumatism, and stated that many cases in which valvular lesions of the heart exist might be considered rheumatic. Tonsillitis and certain skin-eruptions are also observed in connection with rheumatism. The relation of chorea and rheumatism may be more close than would appear from the statistics presented.

DR. JACOBI expressed the view that it is not so much over-study that exercises an influence in the development of chorea, as it is the conditions associated with denutrition. A large number of other diseases is observed in March and April; at that time of the year the system is run down because of deprivation of fresh air during the winter, ill-nutrition, and sundry other causes. Dr. Jacobi has always believed in the intimate connection between chorea and rheumatism, especially since most of these cases of cardiac disease must be due to rheumatism, although the diagnosis is not made. Infantile rheumatism is overlooked, because infants do not have pronounced symptoms; but in a number of cases in which articular rheumatism exists, chorea and heart-disease are present. The joints are not always examined; the frequency of heart-disease in these cases, however, shows a connection. Growing pains are often doubtless rheumatic, and the subsequent history proves them to be so.

DR. LYMAN expressed his belief in the close connection between chorea and rheumatism.

In reply, DR. LEWIS stated that he could not see how, when spring comes, chorea begins if the confinement of the winter has produced it.

DR. W. H. THOMPSON, of New York, read a paper on "The Significance of Intermission in Functional Nervous Diseases." He stated that all derangement of nervous structure must indeed produce derangement of function, but that the reverse of this statement is not always true. Symptoms are often absent in clear cases of disease. Finer methods of microscopic study often prove that disease is dependent upon structural changes, but intermission in disease cannot be explained by the theory of such structural changes. Structure is not enough to explain the working of a mechanism; something more is always demanded—such as a nutritive and energizing fluid or force. Functional nervous poisons have a selective action on various nervous tissues. No drug acts on all tissues alike.

Modern chemistry has shown that auto-infection is a cause of intermittent diseases. A series of poisons is elaborated by the system, the members of which are similar in action to the nerve-poisons of the Materia Medica, and this is illustrated by the action of coline, neurine and muscarine. Natural antisepsis, as of the stomach, intestines and liver, acts antagonistically to the auto-infection arising in these organs, that are subject to nervous influence, and hence the characteristic of intermission is brought about.

DR. S. WEIR MITCHELL read by title the report of "A Case of Crossed Paralysis of the Thermal Sense Without Other Sensory Loss."

DR. H. A. HARE, of Philadelphia, read a paper entitled "A Collective Investigation in Regard to the Value of Quinine in Malarial Hematuria or Malarial Hemoglobinuria." In answer to a series of questions sent to several hundred physicians in malarial districts, Dr. Hare had received 155 answers pertaining to the subject of the paper. It appeared that there was much contradiction in the answers, and that most of the doubt and mystery surrounding the subject yet remained to be cleared up. As a result of the data gathered, Dr. Hare advised that quinine should be given *before*, and not *during* the paroxysm, because of the irritative action on the kidneys. It seems certain that quinine may produce hematuria, as clinical and experimental evidence demonstrate such a relation. Quinine should not be given in hematuria following chronic malarial poisoning.

DR. ATKINSON expressed the view that quinine does not cause hematuria, but that it brings out the idiosyncrasy of the patient in this respect; he has had a number of cases of hematuria without malarial poisoning, and he suggested the query whether hematuria were not due to a parasitic instead of a malarial influence—for example, from the Bilharzia hematobia. In such cases the quinine could do no good. He had found that turpentine was a very excellent remedy. He had looked for filaria sanguinis hominis in these cases, but had not found them.

DR. TYSON urged the value of quinine as a curative agent in the malarial hematuria of moderate type seen in the Middle States; the condition is different in cases of the severe form of the disease. The mischief has then already been done, and quinine will do no good, and the resulting conditions must be treated. Quinine is the proper remedy as a prophylactic. Dr. Tyson's experience confirmed that of Dr. Atkinson, and he advised the use of the natural astringent mineral waters.

DR. STOCKTON alluded to the treatment by large doses of alum that had been advised some years ago for hematuria. In his experience he had found this to be a most excellent remedy in fifteen-grain doses given every hour.

DR. HENRY stated that hemoglobinuria is consequent upon hemoglobinemia, and that there now need be no doubt as to the diagnosis, because we have certain means of ascertaining whether the cause is due to malarial poisoning or not.

DR. VAUGHAN stated that he did not believe that quinine causes hematuria. In Indiana and Michigan it is a common custom to administer tremendous doses of quinine, but cases of hematuria are rare in these States. It would thus seem that some other factor is at work, since the plasmodium of malaria is the same in all parts of the country.

DR. LOVING expressed the belief that the kidney-change had really taken place before the quinine had been administered.

THIRD DAY—MAY 26TH.

DR. STOCKTON read a paper entitled "Misconceptions and Misnomers Revealed by Modern Gastric Research," which was published in THE MEDICAL NEWS of May 28th.

In the discussion, DR. MUSSER urged looking to the

general side of the question as well as to the local, since the gastric condition is often secondary to other conditions; for instance, the general wear and tear is to be considered and the nutrition is to be improved.

DR. LYMAN also emphasized the importance of attention to the general condition, and spoke especially of the arthropathic diathesis, uterine abnormalities, etc., as complicating the gastric condition.

In reply, DR. STOCKTON wished by no means to deny the necessity of general treatment, but especially desired that all treatment should be guided by examination of the stomach and stomach-contents. When the stomach fails in its work, toxemiæ result, with auto-infection. He particularly emphasized the fact that the stomach often manifested no symptoms directly — that the gastric source of the mischief is not always evident, hiding itself under distant symptoms.

DR. CHARLES CAREY, of Buffalo, N. Y., read a paper on "The Production of Tubular Breathing in Consolidation and Other Conditions of the Lungs," which will be published in a subsequent number of THE MEDICAL NEWS. The paper was illustrated by a number of excellent soft-metal castings of the bronchial tubes and bronchioles.

DR. TYSON asked if the rima glottidis might not possibly also contribute to the production of tubular breathing.

DR. MASON spoke of cases in which effusion exists and bronchial breathing does not sometimes take place.

DR. HARE suggested that the elasticity of the openings of the bronchial tubes might be a possible modifying circumstance in producing tubular breathing, rendering the sounds somewhat different from those developed at the edge of the test-tube used in illustration of the phenomenon.

DR. GRIFFITH expressed the belief that the larynx was the primary factor in the production of the bronchial blow; those sounds produced high up were the most pronounced.

DR. LYMAN suggested that a possible modifying factor as regards the pitch of the sound might reside in the increase or decrease in the number of aërial vibrations dependent upon the precipitation downward or elevation upward of the sound produced.

DR. HURD stated that Professor Maull, of Clark University, had been making some excellent casts of lungs, and had found that the bronchi terminated abruptly and in a manner different from that which had usually been pictured.

In reply, DR. CAREY expressed the view that the bronchial "blow" was heard higher up on the right side than on the left, because the first division of the primary bronchus is higher up on this side than on the other.

DR. SAMUEL C. CHEW, of Baltimore, presented a paper entitled "Different Forms of Cardiac Pain." He considered three kinds of such pain: 1. True angina pectoris with increased arterial tension, occurring in paroxysms, and most frequently associated with aortic or coronary disease. 2. Heart-pain from arterio-sclerosis, and often associated with chronic interstitial nephritis. 3. Heart-pain from attenuation of the heart's walls, occurring in different forms of valvular disease that have produced dilatation of the heart. The full text of the paper is to appear in a subsequent number of THE MEDICAL NEWS.

In discussing the paper, DR. STARR stated that a further class of cardiac pain should be added to the classification of Dr. Chew; for example, there was no room in Dr. Chew's classification for the pain of paroxysmal tachycardia; or for that observed in extreme cases of neurasthenia of vasomotor type. Nothnagel has also shown that pain is a symptom in cardiac disease.

DR. MUSSER expressed the opinion that all cardiac pain is anginal in character, and he alluded to cases in which there is pain in the arms without pain in the heart, but with other symptoms of angina. In such cases he advised absolute rest.

DR. MCPHEDRAN stated that he has found nitroglycerin to act better than amyl nitrite in these cases.

DR. STOCKTON expressed his disbelief in the theory that the chief cause of the pain is dilatation of the left ventricle.

The paper of DR. I. N. DANFORTH, of Chicago, on "Tube-casts and their Diagnostic Value," was read by title. It is to appear in a subsequent number of THE MEDICAL NEWS.

The paper of Dr. James C. Wilson, of Philadelphia, on "Pulsating Pleural Effusions" was also read by title, and is to appear in a subsequent number of THE NEWS.

AMERICAN SURGICAL ASSOCIATION.

Thirteenth Annual Meeting, held at Boston, May 31, June 1 and 2, 1892.

FIRST DAY—MAY 31ST. *Morning Session.*

THE President, DR. P. S. CONNER, of Cincinnati, delivered the Annual Address. The ten years of active life of the Association, he said, have been characterized by great extent and accuracy of investigation, by scientific judicious experimentation, by the discovery of important facts, by improvements in the technique of old operations, and by the introduction and general adoption of new procedures. In the study of the causes of disease more positive knowledge has been gained than in all time before, so that in the bacteriologic laboratories a new pathology has been worked out, in large measure revolutionary of both opinion and practice. Speculation and theory have given place to experimentation and fact; and the disease-producing influence of airs, of earths, of waters, have been found to lie in organisms that have been seized upon, separated, classified, and tested.

Since the startling announcement, in 1882, that tuberculosis was dependent upon the presence and action of a definite microörganism that could be isolated, cultivated, and inoculated, a new literature has been written, even a new language created, in which the word "strumous" (except as a synonym of tuberculous) has no more place than the word "phlogiston."

The long-known chronic affections of bone, of joints, of glands, of skin, have been shown to be in great measure the result of the presence and action of a bacillus that everywhere and under all circumstances moves in the same destructive way, though antagonized at every step by the healthy tissues (not seldom successfully), and subject more or less completely to the power of the medical art, directed to the destruction or encapsulation

of the germ, the removal of the infected tissues, or the taking away of the affected part.

The most important work that has been done in connection with surgical tuberculosis is that which has had for its object the discovery and the proper application of a therapeutic agent that will destroy the organism and secure its expulsion from the body or secure such condensation of non-infected tissue about it as shall form a wall and by encapsulation render it harmless. Far better will it be to administer generally or locally a remedy that will remove the bacillus or make it innocuous than to do the most brilliant operation followed by the most rapid healing and recovery in large measure of functional integrity. The end is far from having been reached, but a long step in advance has been made.

Of the three wound-complications that from the earliest times have been the bane of surgery—septic infection, erysipelas, and tetanus—the cause of only the first had been determined a decade ago; that of each is now known.

It is in the treatment of the diseases and injuries of the viscera and their envelopes, however, that the greatest advances in medical art have been made in recent years.

The abdominal cavity, which for so long a time was an almost sacred territory, not to be invaded except under peculiar circumstances and for the relief of a very few morbid conditions, has, because of the secured protection against sepsis, become one of the more common fields of operation in connection with wounds, tumors, obstructions, and infective inflammation.

Penetrating and perforating wounds of the hollow and solid viscera are no longer treated solely by opium and ice with a resulting fatality truly appalling, but by section of the wall, suture of the wound, ligation of the bleeding vessels, and antiseptic plugging, if necessary, of openings in the solid organs. The mortality-rate is still, unfortunately, very high. Not a few of the deaths have been due to the delay, the incompleteness, and the imperfection of the operation, but many must be credited to the damage primarily done. Made by missiles of other than the smallest caliber, a gunshot wound of the stomach, of the intestines, of the mesentery, or of the liver, is likely to prove mortal from shock or hemorrhage, even though treated properly and skilfully, and is almost absolutely certain to do so if fecal extravasation has occurred and septic inflammation has set in. Wounds made by very small balls may be, and have been, recovered from without operative interference, and there is good reason for believing that in the absence of symptoms of active hemorrhage such wounds will do as well, or better, without as with laparotomy. It is as unwise as it is untrue to declare that there are no dangers attendant upon incision of the abdominal walls and exploration of the intestinal tract.

The septic inflammations about the head of the colon, originating so generally in the appendix, have been brought within the province of the surgeon, not, as before, at a late day when the resulting abscess has fortunately come well forward toward the surface, but at an early stage, when, by evacuation of the fluid, with or without removal of the appendix, relief may be afforded and the patient be protected against the lethal effects of perforative peritonitis or perinephritic suppuration. The cases of acute disturbance in the region of the cecum, due to an overloaded bowel or to catarrhal inflammation, will find relief in the future, as in the past, in the therapeutic measures of the physician; but suppurating gangrene producing appendicitis can with safety be treated only by the knife. Whether or not it is advisable to remove, during a quiescent stage, the appendix that has been the seat of repeated attacks of inflammation, is a question as yet unsettled.

An immense amount of work, experimental and operative, has been done in the determination of the proper and most advisable methods of treatment in cases of obstruction, acute and chronic, malignant and non-malignant, at any part of the gastro-intestinal tract. Strictures have been dilated, affected areas removed, anastomosis secured, "cut-offs" established, new openings formed, with the result in favorable cases of effecting cure or affording relief.

Pyloric stenosis, for which ten years ago pylorectomy was all that the surgeon could offer, may now, if of non-malignant character be relieved by digital divulsion through the open stomach, by curetting, by a pyloroplastic operation, or by gastro-enterostomy; and if due to malignant disease, by the latter operation, in every way to be preferred to excision of the carcinomatous mass, being speedier and easier of execution and having a mortality-rate but one-half or perhaps only one-fourth as great. There is a strong and growing feeling that the employment of approximation plates of decalcified bone, of leather, or of potato, or catgut rings or mats, is not only not necessary but rather injurious than otherwise. It is doubtful if operations for carcinoma of the stomach have really been or can be of much service. They certainly have often afforded much temporary relief and are to be resorted to when suffering is great and starvation is imminent; but, on the other hand, the prolongation of life when the operation is recovered from is, with only now and then an exception, but slight.

Malignant disease located in the rectum, too low to be removed through an anterior abdominal incision and too high to be thoroughly extirpated through a perineal one, may be reached from behind after resection of the coccyx, with or without, as necessity may require, resection of the lower portion of the sacrum.

In no other part of intestinal surgery has more been done in thought, in experiment, and in practice, than in that dealing with excisions of the bowel in continuity, rendered necessary on account of wounds, growths or gangrene. As the technique of the operations has been improved, the time of performance has been lessened, the risk to life diminished, and the range of applicability increased. It is still undetermined whether end-to-end or lateral anastomosis is to be preferred; of how much value bone plates or rings or other like aids really are, to the patient at least; how far omental grafts may be required, or how much additional security they afford.

The solid organs have again and again been brought under surgical treatment on account of wounds, of growths, and of tuberculous, parasitic, and suppurative diseases. The kidney, spleen, and even the pancreas, have been removed entirely, the liver in part. The gall-bladder has been opened and its contents removed,

and later sutured and left in place or stitched to the abdominal wall or cut away altogether. Pancreatic cysts have at times been extirpated, at times drained.

The supra-pubic section is now held in high esteem. The treatment of tumors of the bladder has greatly improved and has become more successful. Litholapaxy has taken an established position as the most generally applicable method of dealing with stone, even in young children.

Little has been done in intra-thoracic surgery. Pulmonary abscesses have been evacuated and hydatid cysts have been removed. In a small number of cases pneumonotomy has been performed for tuberculous abscess. Pneumonotomy has been experimentally shown to be easy of performance and attended with no great danger; it will in the future doubtless have a place in the treatment of lung-injuries.

It is in the surgery of the head and spine that the greatest advances have been made, the largest number of new procedures introduced, the most brilliant operations performed; and in these regions more than anywhere else, the surgery of to-day is a new surgery. More and more constantly are all depressed fractures of the skull being treated actively, and basal fractures antiseptically. Stronger and stronger is becoming the conviction of surgeons that fractures of the spine associated with evidence of pressure upon or injury of the cord should not be left to Nature, if the general and local symptoms indicate lesions that can be removed or relieved by elevation or extraction of vertebral fragments, or the lessening of intra-dural tension by opening the sheath.

It has been proved wise to treat bullet-wounds of the brain like other punctured wounds of the organ, by exploring, cleaning, and draining the track; and occasionally it has been found possible to extract the ball through the wound of entrance or a counter-opening in the skull.

Trephining for epilepsy following injury of the skull is no new operation, but of late such treatment has been quite largely employed, not only in cases in which there has been an old fracture or contusion, but in those in which by application of the now well-established rules of cerebral localization, it has been possible to determine the place of a meningeal thickening or of a limited chronic encephalitis, or a new-growth, solid or cystic, acting as an exciting cause of motor disturbance.

Trephining has also been practised for the relief of long-standing severe headache.

Considerable sections of the skull have been taken away to permit of the expansion of the microcephalic brain, but though improvement in the mental condition has followed in certain cases, the operation seems to be of questionable utility. Further investigation must be made into the causes of arrested cerebral development, and as to how far it is productive of, and how far consequent upon premature ossification of the cranium.

Insanity of traumatic origin has, in a very large proportion of the few cases surgically treated, been much improved or cured.

The lateral sinus has been successfully opened in several cases for the removal of pyogenic thrombi.

In not a few cases intra-cranial abscesses have been definitely located and operatively relieved.

The most brilliant chapter in the history of brain surgery in recent times, however, is that relating to tumors. It has become possible to locate, with close approximation to exactness, the position of the neoplasm and its character.

Much less operative work has been done upon the spine than upon the head. Abscesses have been evacuated for the relief of paralysis. Tumors pressing upon the cord have been removed.

Congenital malformations, meningocele, encephalocele, and spina bifida, have been subjected to surgical treatment, with increasing success as improvements have been made in the methods of execution. Renewed attempts have been made to permanently get rid of intra-ventricular effusions by tapping and drainage, but the results have not been what might be desired, whether the old route to the ventricle has been followed or the new lateral one.

DR. JOHN B. ROBERTS, of Philadelphia, read a paper entitled "The Treatment of Uncomplicated Fractures of the Lower End of the Humerus." The following are the conclusions presented:

In the treatment of fractures of the lower extremity of the humerus, the divergent angle between the axes of the arm and forearm must be preserved; and hence dressings that interfere with the normal difference in the level of the radius and ulna are not permissible.

Fractures of the lower extremity of the humerus of ordinary severity are, as a rule, more successfully treated in the extended than in the flexed position, because the "carrying function" is less liable to be impaired.

Passive motion at an early date is harmful; and should be deferred until union has occurred and the dressings have been finally removed.

Good results as to anatomic conformation and as to motion are generally to be expected and can usually be obtained.

Recent fractures in which satisfactory coaptation is not obtainable under anesthesia may with propriety be subjected to exploratory aseptic incisions. Old fractures in which deformity and impairment of function are marked, may, within certain limitations, be subjected to re-fracture or osteotomy, for the relief of these conditions.

DR. JOHN E. OWENS, of Chicago, stated that he had never treated fractures of the lower extremity of the humerus in the extended position. The treatment of such fractures in the extended position seems to recommend itself for the following reasons: In the extended position there is no room in the olecranon fossa for neoplastic deposits; the superabundance of soft tissues in front of the joint when the arm is flexed masks the symptoms; the soft tissues in front of the arm present more opportunity for laceration and cicatricial contraction; in the extended position no traction is made upon the vessels and nerves; and the natural angularity between the arm and forearm is preserved.

Dr. Owens had experienced considerable timidity in the treatment of fractures at the elbow, on account of the impaired mobility that often results. The natural position of the arm in relaxation is one of flexion. He had treated these fractures in the flexed position. The extended position may cause tilting forward of the upper extremity of the lower fragment or its rotation forward, or hyper-extension may be caused.

Passive motion is resorted to in four or five weeks to an extent short of causing suffering. The material used for the splint is plaster-of-Paris. Dr. Owens had treated many of these fractures in cases in which the injury resulted from railroad accidents, and in which suits for damages are common, but he knew of no case in which the question of defective treatment entered successfully.

DR. JOHN H. PACKARD, of Philadelphia, remarked that it was often difficult to tell the exact character of a fracture at the elbow-joint even under the most favorable opportunities for examination. He thought that the carrying function was rarely perfectly maintained under any plan of treatment. After fracture running into the joint there is liability to the formation of adhesions. He thought that passive motion should be resorted to before the organization of these adhesions. He advocated treatment of these fractures in the flexed position, and described a splint of sheet zinc that he had used with satisfaction.

DR. CHARLES B. PORTER, of Boston, contended that the treatment advocated in the paper violated one of the first principles in the treatment of fracture—that is, to place the muscles in a state of relaxation. In the extended position the muscles that should be relaxed are not at rest. He had never seen any statistics in regard to the results of treatment of fracture in the extended position, in comparison with those treated by the the flexed position. Until these are forthcoming, the profession will be unwilling to accept this as the best method of treatment. He therefore adhered to the treatment of these fractures in the flexed position. Before the fracture is dressed, it should be adjusted under ether and then not disturbed for two or three days, and, if found in position, not again dressed for a week or ten days. In old fractures, if there is sufficient deformity to demand osteotomy, resection of the elbow is better and may secure a very useful arm.

DR. J. FORD THOMPSON, of Washington, D. C., expressed his disapproval of the plan of treating fractures of the lower extremity of the humerus by means of a right-angled splint. In his practice he adopted that plan of treatment which permitted the axes of the fragments to be brought into relation with each other. This he had found to be the extended position. In two cases of compound fracture he had been unable to bring the fragments into line until the forearm was extended. The difficulty about the extended position is that it is disagreeable and uncomfortable to the patient. He considered plaster-of-Paris to be the best dressing.

DR. A. G. GERSTER, of New York, maintained that the bad results that are often seen after fractures at the lower extremity of the humerus, are not necessarily due to the method of treatment. In several cases in which he had had an opportunity to examine the joint, he had found that the trouble was due to the throwing out of callus at points where the callus has been stripped off. Bad results are also often due to insufficient examination. Anesthesia is not employed, and the dislocation that may accompany the fracture is not recognized. In the treatment of the fracture, after replacing the fragments, such methods must be employed as will hold the fragments in place. The flexed or extended position must be employed as necessary. He had found that, as a rule, the fragments were best held in place by treatment in extension. He does not employ passive motion, and considers it useless and often harmful.

DR. STEPHEN H. WEEKS, of Portland, Me., stated that it was his custom to treat supra-condyloid fractures of the humerus in a position of flexion, but he was satisfied that satisfactory results are secured by different methods of treatment.

DR. T. J. DUNOTT, of Harrisburg, Pa., expressed the opinion that the manner in which the injury had been received had much to do with the ultimate result. The flexed position would give a good result in many of these fractures associated with severe injuries. He prefers to treat the arm in such a position that the radius and ulna are parallel. In many cases in which great injury is done to the soft parts no splint can be applied, and under such circumstances the arm should be laid on a pillow and lead-water and laudanum applied for some days, until the tumefaction subsides. If necessary, incision into the tense tissues is made.

DR. W. H. CARMALT, of New Haven, stated that in some cases the ulna acted as a wedge between the two fragments at the lower extremity of the humerus, forcing them apart, and reported a case recently treated in the flexed position, extension being employed by means of weights, a satisfactory result having been obtained.

DR. J. COLLINS WARREN, of Boston, stated that he had observed the difficulty mentioned by Dr. Carmalt, but had attributed it to drawing forward of the condyles rather than to sinking in of the ulna. Dr. Bigelow had laid down the excellent rule of going through the movements for reducing a dislocation at the elbow in these cases. In this way the danger of overlooking a dislocation is avoided, and if there is simply a fracture the manipulations mould the bone into place. The flexed position, with an internal angular splint, seems to be the best method.

Afternoon Session.

DR. JOHN B. ROBERTS, of Philadelphia, read a paper entitled "The Treatment of Uncomplicated Fractures of the Base of the Radius." The following conclusions were presented:

Fractures of the lower extremity of the radius vary comparatively little in their general characteristics, because but one form is usual.

Muscular action has little or nothing to do with producing or maintaining the deformity.

Immediate reduction of the fragments is the essential of treatment.

Many of the splints devised for the treatment of this fracture have been constructed in ignorance of the pathology of the condition.

The ordinary fracture of the lower extremity of the radius usually requires no splint, and should be dressed with a wristlet of adhesive plaster or bandage.

When a splint is required, a narrow, short dorsal splint, fixing the wrist, is all that is necessary.

The method of dressing here advocated is the best, because it annoys the patient as little as possible, by avoiding cumbersome appliances, and permits free voluntary movements of all the finger-joints.

Passive motion is unnecessary until union has occurred and the dressings have been finally removed.

Good use of the wrist and fingers is early obtained,

and the anatomic conformation is restored as well as, and perhaps better than, by other more complicated dressings.

Old fractures which have been improperly treated, by omission of immediate reduction, may with considerable success be subjected to re-fracture at the expiration of six weeks or more. At later periods readjustment may be possible only by osteotomy, which is a legitimate means of treatment.

DR. JOHN H. PACKARD, of Philadelphia, stated that in 1879 he had read a paper on this subject before the American Medical Association, in which he took the ground that the great difficulty in many of these cases arose from non-reduction. If the fracture of the lower extremity of the radius, commonly known as Colles's fracture, is once reduced, there is little tendency to reproduction of the deformity. Many physicians think that all that is necessary is to apply the proper dressing. The most important step in the treatment is reduction. He did not agree with the fifth proposition, that no splint is required. He employs an anterior splint padded to fit the curve of the radius and reaching to the ball of the thumb. The patient can use the fingers freely. In ordinary cases this simple splint suffices.

DR. CHARLES B. PORTER, of Boston, emphasized the necessity of complete anesthesia, then complete reduction and breaking up of the impaction, and then the application of posterior and anterior splints; after a week or ten days he allows motion of the fingers, and in two weeks motion at the wrist. He considers passive motion unnecessary, except in old people in whom there is a rheumatic or gouty tendency.

DR. J. FORD THOMPSON, of Washington, dwelt upon the disastrous results that often followed failure to reduce the displacement, or the use of improper dressings. After reduction of the fragments he applies anterior and posterior splints secured lightly to the arm. He had not, as a rule, found it necessary to employ ether to facilitate reduction. In cases in which there was severe pain following the application of the ordinary splint, instant relief followed the application of a plaster splint, the hand being carried well to the ulnar side. In several cases in which the hands were useless from the inflammation of the sheaths of the tendons he had tried to break the adhesions up under repeated administration of anesthetics, but the results had not been decided.

DR. JOSEPH RANSOHOFF, of Cincinnati, stated that in some cases the reduction could not be effected so readily as had been indicated. He had had three or four cases in which extension would not overcome the difficulty, and in such cases hyper-extension was resorted to. In the treatment he is partial to the Levis splint. After a week or ten days passive motion is resorted to.

DR. CHARLES B. NANCREDE, of Ann Arbor, called attention to the fact that a certain amount of the bone-tissue at the seat of fracture is destroyed, so that some deformity will necessarily follow. Reduction is the most important measure in the treatment. The fragments are then to be held in place by suitable apparatus.

DR. JOHN HOMANS, of Boston, read a paper on "Fibroid Tumors of the Uterus," which will be published in a subsequent number of THE NEWS.

(To be continued.)

CORRESPONDENCE.

A CORRECTION FROM DR. WOOD.

To the Editor of THE MEDICAL NEWS,

SIR: I beg to correct an error into which your reporter (MEDICAL NEWS, May 28th, p. 605) has fallen as to my advice in regard to the disposal of homicidal maniacs. I did not say what is attributed to me. In substance, I said that it was justifiable to put to death certain homicidal maniacs whose whole lives are given up to planning to kill their attendants, and that it was not right to tax people to pay others to risk their lives in feeding and otherwise taking care of such human tigers.

H. C. WOOD, M.D.

1925 CHESTNUT STREET.

NEWS ITEMS.

The British Medical Association will hold its sixtieth annual meeting at Nottingham, July 26, 27, 28, 29, 1892.

The "Address in Medicine" will be delivered by Dr. James Cuming, of Belfast; the "Address in Surgery," by Dr. W. H. Hingston, of Montreal; the "Address in Bacteriology," by Dr. German Sims Woodhead, of London.

In the Section of Medicine a discussion on "Peripheral Neuritis" will be opened by Dr. J. S. Bristowe.

A discussion on "The Prognosis and Treatment of Ascites" will be opened by Dr. W. B. Cheadle.

The following papers are announced:

"On the Value of Perimeter Measurements in the Diagnosis of Local Brain Disease," by Dr. Byrom Bramwell. "On Some Complications and Sequelæ of the Infectious Fevers," by Mr. Francis Hawkins. "Subacute Non-rheumatic Myocarditis," by Dr. Laurence Humphry. "Treatment of Pneumonia by the Ice-bag," by Dr. D. B. Lees. "The Association of Sensory Disorders with Visceral Disease," by Dr. J. Mackenzie. "Note on the Relief of Ascites by Establishing a Fistulous Communication with the Rectum by Operation," by Dr. Murray. "Peripleuritis," by Dr. P. Blaikie Smith.

In the Section of Surgery a discussion on "The Surgery of the Thorax" will be opened by Mr. Rickman J. Godlee. A discussion on "The Surgery of the Liver and Gall-bladder" will be opened by Mr. A. W. Mayo Robson. A discussion on "The Treatment of Spinal Abscess" will be opened by Mr. W. Watson Cheyne.

The following papers are announced:

"On Appendicitis," by Mr. H. Gilbert Barling. "On Rectal Cancer," by Mr. Harrison Cripps. "The Restoration of the Lost Function of Micturition," by Mr. Reginald Harrison. "The Later Results of Laminectomy for Angular Curvature," by Mr. W. Arbuthnot Lane. "On Pancreatic Surgery," by Mr. Jordan Lloyd. "A Case of Simultaneous Ligature of the Subclavian and Common Carotid Arteries for Aneurism of the Innominate Artery," by Dr. C. H. Marriott. "A Case of Supra-pubic Lithotomy," by Dr. W. Newman. "On the Use of the Omentum in Intra-peritoneal Operations," by Dr. N. Senn. "Practical Points in the Surgery of Cancer," by Dr. Herbert Snow. "A Review of Twenty-

five Cases Illustrating the Surgery of the Thyroid Gland," by Dr. C. J. Symonds. Mr. J. R. Morison will exhibit (1) a specimen from a successful case of ileo-colostomy for chronic ileo-colic intussusception; (2) a specimen from a case of combined excision of the pylorus and gastro-enterostomy.

In the Section of Obstetric Medicine, a discussion upon "The Treatment of Uterine Fibroids" will be opened by Mr. J. Knowsley Thornton. A discussion on "Post-partum Hemorrhage" will be opened by Mr. G. E. Herman.

The following papers are announced:

"The Proper Use of Midwifery Forceps," by Dr. A. E. Aust-Lawrence. "A Consideration of the Less Obvious Causes of Retardation in the First Stage of Labor," by Mr. W. Bain. "Note on a Case of Cystocele Treated by Stoltz's Method," by Mr. E. S. Bishop. "Ergot as a Muscular Tonic during Pregnancy," by Mr. F. Borough. "On a Case of Total Extirpation of the Uterus through the Vagina for Cancer, with the Result One Year after the Operation," by Mr. W. J. Cant. "The Medicinal and Mechanical Methods of Expediting Pregnancy," by Mr. J. Dysart McCaw. "On the Electrical Treatment of Uterine Fibroids, Scientifically Considered," by Dr. H. McClure. "On Post-partum Hemorrhage," by Dr. I. More Madden. "Stoltz's Operation for Cystocele," by Dr. A. D. Leith Napier.

In the Section of Public Medicine the following subjects are suggested as suitable for discussion, but the list is open to modification: 1. "Legal Restraint upon the Employment of Women in Factories before and after Childbirth." 2. "The Use and Abuse of Infantile Insurance." 3. "Coroner's Inquests." 4. "Disposal of the Dead in the Future; Cemeteries and Crematoria." 5. "The Future of Hospital Isolation for Infectious Diseases." 6. "The Isolation of Measles." 7. "The Notification of Erysipelas and Puerperal Fever." 8. "The Diminished Mortality from Scarlet Fever." 9. "Is Smallpox Dying Out in the British Isles?" 10. "Endemic Typhoid." 11. "Epidemic Alternations." 12. "Offensive Trades in Towns." 13. "Methods of Dealing with Town Refuse in the Midst of Populated Districts." 14. "Ventilation of Town Sewers." 15. "The Condemnation of Tuberculous Meat: to what Extent should this be Carried?" 16. "Relation of Medical Officer of Health to the Sanitary Staff." 17. "Epidemic Influenza; the Attitude of Public Authorities toward it."

The following papers are announced:

"A Contribution on the Condemnation of Tuberculous Meat," by Dr. J. S. Cameron. "On the Influenza Epidemics of 1891–2 Considered Mainly from a Statistical Standpoint," by Dr. F. A. Dixey. "Contribution on Disposal of the Dead in the Future," by Mr. Joseph Loane. "On an Epidemic of Cerebro-spinal Meningitis," by Mr. H. G. H. Monk. "On Epidemic Enteric Fever," by Dr. Scott Tew.

In the Section of Psychology, the President, Mr. William Bevan Lewis, will deliver an Introductory Address.

The two following subjects have been chosen for special discussion: 1. "Psychoses after Influenza," to be opened by Dr. Julius Althaus. 2. "Insanity as a Plea for Divorce," to be opened by Dr. Lionel A. Weatherley.

The following papers are announced:

"Variations in Type of General Paralysis," by Mr. F. St. J. Bullen. "Minor Psychical Disturbance in Women," by Dr. Harry Campbell. "Paranoia and its Relationships," by Dr. Dunn. "The Pathological Anatomy of Acute Encephalitis: an Experimental Study," by Dr. Edwin Goodall. "On Microcephaly," by Dr. Robert Jones. "The Value of Hypnotism in Chronic Alcoholism," by Dr. C. Lloyd Tuckey.

In the Section of Pathology the following papers are announced:

"Variability of Microbes," by Mr. J. G. Adami. "Carcinoma of Mamma," by Mr. Cecil Beadles. "Phagocytosis in Relation to Erysipelas, by Mr. T. J. Bokenham. "1. Experimental Epilepsy; 2. Theory of Tumors; 3. Specimens," by Dr. C. Boyce. "Macro- and Microscopic Preparations of Pathological Brains and Spinal Cords, with Lantern Demonstrations," by Dr. Alexander Bruce. "Dystrophia Muscularis," by Dr. Alexander Bruce and Dr. John Thompson. "Museum Casts," by Mr. C. W. Cathcart. "1. Ataxic Paraplegia; 2. Endothelioma of the Dura Mater," by Mr. Mitchell Clarke. "Morbid Conditions of Stomach in Phthisis," by Dr. Soltau Fenwick. "1. Pathology of Jaundice; 2. Pathology of Diabetes," by Dr. Vaughan Harley. "Edema," by Mr. Victor Horsley. "Cerebral Tumor," by Dr. Laurence Humphry. "Carcinoma of Mamma," by Mr. Raymond Johnson. "Pathology of Chlorosis," by Dr. E. Lloyd Jones. "1. Immunity; 2. Specimens of Madura Disease," by Mr. A. A. Kanthack; "Experimental Diphtheritic Paralysis," by Dr. Sidney Martin. "Myxedema," by Mr. George Murray. "Leukocythemia," by Dr. Muir. "Researches in Cancer Pathology," by Dr. Herbert Snow. "Carcinoma of Mamma," by Mr. Harold Stiles. "Diabetes," by Mr. H. J. Tylden. "Morbid Conditions of Bone," by Dr. Alexis Thomson. "Rate of Beat of the Heart in Health and Disease," by Prof. C. J. Roy. "1. Typhoid Fever in Animals; 2. Paralysis from the Poison of Bacillus Pyocyaneus," by Dr. A. Ruffer.

In the Section of Ophthalmology a discussion on the "Treatment of Diseases of the Lachrymal Apparatus" will be opened by Mr. Charles Higgens.

The following papers have been announced:

"Prolapse of the Iris after Simple Cataract Extraction, and its Treatment," by Mr. W. J. Cant. "The Registration of Defects of Color Perception," by Dr. W. F. Edridge-Green. "Notes on a Case of Tumor of Right Orbit; Operation; Recovery," by Dr. J. Farrar. "1. Some Improvements in Perimetry; 2. A Modification of Foerster's Box for Testing the Light-sense; 3. The Treatment of Cataract Extraction and other Wounds by Antiseptics," by Mr. M. B. Fergus. "Chloride of Sodium as a Direct Agent in the Production of Cataract," by Mr. A. V. Ford. "1. Ten Years' Experience of the Effects of the Treatment of Interstitial Keratitis by Syndectomy without the Use of Specific Drugs; 2. A New Operation for the Treatment of Eversion of the Lower Lids Associated with Granular Lids; 3. Further Researches into the Localization of Headaches Due to Various Forms of Ametropia, including Cases of Vertigo, *Petit Mal*, and True Epilepsy, Cured by the Use of Correcting Lenses," by Mr. H. B. Hewetson. "The Pathology of Some Intra-ocular Tumors," by Mr. J. B. Lawford.

"Note on the Relationship of Convergence to Accommodation," by Mr. A. S. Percival. "The Operative Treatment of Trachoma," by Mr. S. Stevenson. "A Complicated Case of Monocular Hemiopia," by Mr. S. J. Taylor. "A Primary Sarcoma of Iris, with Microscopic Sections," by Mr. G. E. Williamson.

In the Section of Diseases of Children, a discussion upon "The Diagnosis and Treatment of Croupous Pneumonia in Children" will be opened by Dr. James F. Goodhart. A discussion on "The Treatment of Severe Club-foot" will be opened by Mr. J. Walsham.

Mr. E. L. Freer will read a paper on "The Treatment of Scoliosis."

In the Section of Pharmacology and Therapeutics a discussion on "Cardiac Tonics and the Indications for their Use" will be opened by Dr. William H. Broadbent. A discussion on "Dyspnea and its Treatment by Drugs" will be opened by Professor W. T. Gairdner.

Prof. Liebreich, of Berlin, has deputed Dr. A. P. Chadbourne to present a communication reporting, the outcome of researches in the laboratory of the former.

In the Section of Laryngology a discussion upon "The Etiology, Pathology, and Treatment of Nasal Neuroses" will be opened by Dr. Donald Stewart and Dr. Adolf Bronner. A discussion upon "Catarrh of the Nose and Throat; its Etiology, Pathology, and Treatment" will be opened by Mr. J. Macintyre. A discussion upon "Granular Pharyngitis; its Etiology and Treatment," will be opened by Mr. T. Mark Hovell.

Mr. Mayo Collier will read a paper on "The Causation of Deflections and other Irregularities of the Nasal Septum;" Dr. Watson P. Williams, a paper on "The Dyspeptic Sore-throat."

Preliminary Program for the Section on Dermatology and Syphilology of the American Medical Association.—

Address by the Chairman, Dr. Bulkley: Recent Advances in the Treatment of Diseases of the Skin.

Louis A. Duhring, M.D., of Philadelphia: Local Treatment of Acute Vesicular Eczema.

C. P. Russell, M.D., of Utica, N. Y.: Eczema of Infancy and Childhood, with Special Reference to Etiology and Dietetic Treatment.

L. Duncan Bulkley, M.D., of New York: Diagnosis and Treatment of Eczema Seborrhoicum.

George T. Elliot, M.D., of New York: Seborrhoic Eczema as a Cause of Alopecia.

B. M. Ricketts, M.D., of Cincinnati, Ohio: Report of Forty Cases of Psoriasis Treated Exclusively with Arsenious Acid.

A. Ravogli, M.D., of Cincinnati, Ohio: The Influence of the Nervous System on Certain Disturbances of the Skin.

W. H. Dunlap, M.D., of Syracuse, N. Y.: An Unusual Case of Pemphigus Hemorrhagicus.

C. P. Russell, M.D., of Utica, N. Y.: Case of Acute Circumscribed Cutaneous Edema.

A. H. Ohmann-Dumesnil, M.D., of St. Louis, Mo.: Some Successful Methods in the Treatment of Alopecia Areata.

James H. Dunn, M.D., of Minneapolis, Minn: A Case of Tubercular Adenitis, with General Alopecia and Pruritus.

Eustathius Chancellor, M.D., of St. Louis, Mo.: The Diagnostic Significance of Diseases of the Finger-nails.

W. H. Righter, M.D., of Topeka, Kansas: Report of a Case of Verruca Papillaris of the Upper and Lower Lips.

Answers to Questions in Question Box.

James C. McGuire, M.D., Washington, D. C.: Excision of the Chancre as a Means of Aborting Syphilis, with a Report of Several Cases.

H. Goldenberg, M.D., of New York: Chancre of the Finger with Special Reference to Adjoining Adenopathy.

W. F. Breakey, M.D., of Ann Arbor, Mich.: A Case of Lupus.

Edward Preble, M.D., of Cleveland, Ohio: On a New and Practical Method of Grouping Affections of the Skin, with a Brief Analysis of One Thousand Cases.

E. Chenery, M.D., of Boston, Mass.: Experiences with Scabies.

L. D. Bulkley, M.D. and H. A. Pulsford, M.D., of New York: Clinical Notes on the Cases of Vegetable Parasitic Diseases Treated at the New York Skin and Cancer Hospitals.

The Medical Society of the State of Washington held its third annual meeting at North Yakima, May 11th and 12th.

The following papers were read: "Report on Practice of Medicine," by C. K. Merriam, of Spokane; "Typhoid Fever and its Treatment," by C. P. Thomas, of Fairhaven; "Report of a Case of Leprosy," by H. C. Willison, of Port Townsend; "Report of Eight Major Amputations," and "Report of a Melanotic Sarcoma of Neck," by J. B. Eagleson, of Seattle; "Report on Ophthalmology and Otology," by A. B. Kibbe, of Seattle; "Some Practical Points on Diseases of the Ear," by L. R. Thomson, of Spokane; "Sympathetic Ophthalmia," by G. H. Mauzey, of Spokane; "Treatment of Immature Cataract by the Kalisch Method," by G. S. Armstrong, of Olympia; "Report of Four Laparotomies," by C. A. Smith, of Seattle; "Treatment of Epilepsy," by C. W. Sharples, of Seattle; "Report on History and Necrology," by G. A. Weed, of Seattle.

The following officers were elected for the ensuing year: *President*, N. Fred. Essig, of Spokane; *First Vice-President*, G. S. Armstrong, of Olympia; *Second Vice-President*, F. M. Bell, of Kelso; *Secretary*, G. D. Shaver, of Tacoma; *Treasurer*, J. B. Eagleson, of Seattle.

The next meeting will be held at Tacoma on the first Wednesday in May, 1893.

The Philadelphia Alumni Society of the Medical Department of the University of Pennsylvania held its first regular meeting at the Colonnade Hotel, Fifteenth and Chestnut Streets, on Saturday evening, May 14th. This Society is a local branch of the parent Alumni Society as provided for in Article VIII. of its constitution, and has elected the following officers:

President: Dr. Roland G. Curtin.

Vice-Presidents: Dr. Edward L. Duer, Dr. S. D. Risley, and Dr. Henry Beates, Jr.

Recording Secretary: Dr. Ellwood R. Kirby.

Corresponding Secretary: Dr. Benj. F. Stahl.

Treasurer: Dr. Joseph P. Tunis.

Executive Committee: Dr. Judson Daland, Dr. A. C.

Wood, Dr. Richard Norris, Dr. William R. Lincoln, and Dr. Harry Toulmin.

It is proposed to hold four meetings during the year, on the second Saturday of the months of November, January, March, and May, which shall be largely of a social character. Already the plan has been heartily indorsed by a large number of graduates, and more than one hundred and twenty-five men have signed the constitution.

Action of the Pennsylvania State Medical Society as regards Nostrums.—At a meeting of the Philadelphia County Medical Society, held May 25, 1892, Dr. John B. Roberts, President, reported that the Medical Society of the State of Pennsylvania had unanimously adopted the resolutions sent up by the Philadelphia County Society, in condemnation of the practice of giving certificates to secret medicines, and of the action of the *Journal of the American Medical Association* in publishing advertisements of such preparations. On motion it was resolved to print one thousand copies of the resolutions of Dr. S. Solis-Cohen's paper, offering the same for distribution at the Detroit meeting of the American Medical Association.

The American Climatological Association will hold its ninth annual meeting at Richfield Springs, N. Y., June 23 and 24, 1892.

CORRECTION.

In the table on page 577 of THE NEWS of May 21, 1892, it was intended to say that "hydroleine" contained salicylic acid, not "salicylic alcohol."

BOOKS AND PAMPHLETS RECEIVED.

Sixth Annual Report of the State Board of Health. Harrisburg: E. K. Meyers, State Printer, 1892.

Pads of Absorbent Gauze as a Substitute for Flat Sponges in Abdominal Surgery. By William E. Ashton, M.D. Reprint, 1892.

A Successful Case of Lateral Anastomosis of the Ileum for Malignant Stricture. By W. E. Ashton, M.D. Reprint, 1892.

Case of Porencephalon in which Trephining was Done. By DeForest Willard, M.D., and J. Hendrie Lloyd, M.D. Reprint, 1892.

The Electro-therapeutics of Gynecology. By Augustus H. Goelet, M.D. Two Volumes. Physicians' Leisure Library. Detroit, Mich.: George S. Davis, 1892.

Myelitis in a Case of Incipient Spinal Sclerosis. By J. T. Eskridge, M.D. Reprint, 1892.

Thirty-two Unselected Abdominal Sections. By Thomas Opie, M.D. Reprint, 1891.

Cancer and Its Treatment. By Daniel Lewis, A.M., M.D., Ph.D. Detroit, Mich.: G. S. Davis, 1892.

A Case of Tracheotomy for Multiple Neoplasms of the Larynx. Clinical Lecture, delivered at Jefferson Medical College Hospital. By J. Solis-Cohen, M.D. Reprint, 1892.

Routine Syringing Out of Cortical Matter in Cataract Extraction. By J. A. Lippincott, M.D. Reprint, 1892.

Thirty-first Annual Report of the Cincinnati Hospital, for the Year Ending December 31, 1891. Cincinnati: Commercial Gazette Job Print, 1892.

Stricture of the Larynx. By J. Solis-Cohen, M.D. Reprint, 1892.

The Symptoms and Pathological Changes in the Upper Air-Passages in Influenza. By J. Solis-Cohen, M.D. Reprint, 1892.

Papers on the Epidemic of Influenza from 1889 to 1892. By Roland G. Curtin, M.D., and Edward W. Watson, M.D. Reprint, 1892.

A Suggestion About Prisms. By James Wallace, M.D. Reprint, 1892.

The Science and Art of Midwifery. By William Thompson Lusk, A.M., M.D. New Edition, Revised and Enlarged, with Numerous Illustrations. New York: D. Appleton & Co., 1892.

Two Cervical Muscle Anomalies in the Negro. By Middleton Mitchell, M.D. Reprint, 1892.

Transactions of the New York State Medical Society for the Year 1891. Vol. VIII. Edited for the Association by E. D. Ferguson, M.D. New York City: Published by the Association.

Diseases of the Urinary Apparatus. Phlegmasic Affections. By John W. S. Gouley, M.D. New York: D. Appleton & Co., 1892.

Diabetes Mellitus and Lesions of the Pancreas. By R. T. Williamson, M.D., of London. Reprint, 1892.

Twentieth Annual Report of the Health Department of the City of Boston, for the Year 1891. Boston: Rockwell & Churchhill, 1892.

Strongylus Rubidus. By Albert Hassall, M.D., and C. W. Stiles, M.D. Reprint, 1892.

Extrait du Bulletin de la Société Zoölogique de France, pour l'année 1891. Notes sur les Parasites—III: Sur l'hôte intermediare l'Echinorhynchus gigas? Par Charles W. Stiles, Ph.D. Paris: Au Siége de la Société Zoölogique de France, 1891.

The Treatment of Sciatic Neuritis by the Local Abstraction of Blood. By F. Gundrum, M.D. Reprint, 1892.

A Neglected Case of Chronic Pleurisy. By William H. Dukeman, M.D. Reprint, 1892.

The Cure of Stricture Simplified. By William H. Dukeman, M.D. Reprint, 1891.

The Bullous Form of Iodic Eruption. By Prince A. Morrow, M.D. Reprint, 1892.

Some Differential Points in the Diagnosis of Syphilis and Tuberculosis, with Illustrative Cases. By Prince A. Morrow, M.D. Reprint, 1892.

The Pathology and Treatment of Tetanus. By D. Braden Kyle, M.D. Reprint, 1892.

Bureau of Information, Circular No. 9, 1891. Biological Teaching in the Colleges of the United States. By John P. Campbell, A.B., Ph.D. (Johns Hopkins). Washington: Government Printing Office, 1891.

Bureau of Information, Circular No. 5, 1891. The History of Higher Education in Ohio. By George W. Knight, Ph.D., and John R. Commons, A.M. Washington: Government Printing Office, 1891.

The Annual Report of the Health of the Imperial Navy, for the Twenty-third Year of Meiji. Tokyo, 1890.

Reports of the Wills Eye Hospital for the Years Ending December 31, 1890, and December 31, 1891. Philadelphia, 1891.

A Series of Fifty Consecutive Operations for Cataract. By Robert L. Randolph, M.D. Reprint, 1892.

Medical Education and Legislation. By George J. Engelmann, M.D. Reprint, 1892.

A Clinical Study of the Ocular Symptoms Found in the So-called Mongolian Types of Idiocy. By Charles A. Oliver, M.D. Reprint, 1892.

The Fourth International Prison Congress, at St. Petersburg, Russia. By C. D. Randall, Official Delegate from the United States. Washington: Government Printing Office, 1891.
